

# **Marri Wind Farm**

Traffic Impact Statement

## **Alinta Energy**

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# Executive summary

Marri WF Pty Ltd as trustee for the Marri WF Unit Trust (the Proponent), a wholly owned subsidiary of Alinta Energy Pty Limited (Alinta Energy), is seeking approval to develop Marri Wind Farm (the Proposal) located approximately 20 kilometers (km) south of the township of Dandaragan within the Shire of Dandaragan. This Proposal will have up to 82 wind turbines, each up to 275 m maximum height and capacity to generate up to 550 megawatts (MW) renewable energy, with an operational life of 35+ years. The project site is located approximately 140 km north of Perth, east of Brand Highway, near Dandaragan and Gillingarra Roads.

Aurecon was engaged to prepare a Traffic Impact Statement (TIS) as part of the Development Application, in accordance with the WA Planning Commission's (WAPC) Transport Assessment Guidelines (Volume 4 – Individual Developments). This assessment is based on a desktop review of publicly available traffic data and road network conditions surrounding the project site.

This assessment identified the below key findings:

- **Primary access:** Brand Highway is the highest-order road providing access into the general area of the site. The primary intersection from Brand Highway is proposed via either Dandaragan Road or Gillingarra Road—both Dandaragan Shire-managed roads, which then connect directly to project-specific private access roads, or via other lower order local roads (also owned by the Shire of Dandaragan) and then project-specific private access roads. Final selection of primary intersection is pending further investigation will be made once the delivery port is confirmed as an outcome of the procurement and contracting process.
- **Secondary access:** Two potential additional accesses are also proposed off the Brand Highway, for more specific uses compared with the above primary accesses. The substation is located on the west side of Brand Highway and so would require a direct access from this. This would require a permanent intersection so to maintain access for operation staff. A temporary turn-around facility is also considered, located at the northern end of the Project Site as to allow Oversize Overmass (OSOM) vehicles travelling to the site from the south to instead pass Gillingarra Road (if selected as the primary access), and turnaround and enter the road from the northern approach. This would avoid conflicts with 'significant' vegetation (i.e. previously mapped or newly recorded instances of Threatened Ecological Communities/TEC).
- **Local road network:** Shire roads are anticipated to cater for the anticipated volume of traffic of the project without affecting their operations, including Koodjee, Moochamulla, Walyer Walyer, Walyoo, and Rowes Roads. However, some sections are unsealed or narrow and will require upgrades or condition reporting.
- **Traffic volumes:** Existing traffic volumes on the roads surrounding the project site are low, though school buses and agricultural vehicles are present.
- **Construction impact:** The proposed construction activities identified by this study are expected to add 40 light, 19 heavy, and 1 OSOM vehicle trips per hour (return i.e. in and out) during the peak of the construction period, which will access various locations dispersed across the project site (i.e. not all using the same internal access point). This demand is considered to result in a 'Moderate' impact by the WAPC Transport Assessment Guidelines (Volume 4 – Individual Developments) and require a Traffic Impact Statement (this study).
- **Operational & decommissioning phases:** The project site is expected to generate lower traffic volumes during both operational and decommissioning phase compared to the construction period. Decommissioning impacts will be assessed in a future transport assessment.
- **Site access design:** Each potential access points will clearing and temporary hardstands. If Gillingarra Road is selected as the primary access road for the Project, this would necessitate upgrades including the intersection with Brand Highway (subject to further consultation).
- **Internal layout:** Key intersections and vegetation conflicts within the internal road network have been reviewed. Further refinement and swept path analysis will be undertaken in later stages of the design.

- **Oversize transport:** Blade transport vehicles (up to 103.1 m in length) and tower components require route planning with overhead clearance up to 6.8 m. Port-to-site routes from Geraldton and AMC Ports have been identified, with potential modifications required across key turns along each route. Transportation of the transformer represents the heaviest load to be transported, currently adopted with a 190 tonne transformer.
- **Approvals & coordination:** Engagement with Main Roads, the City of Greater Geraldton, the Shire of Dandaragan and other asset owners will be necessary for route approvals and infrastructure modifications.
- **Traffic management:** An Oversize Overmass (OSOM) Traffic Management Plan must be approved by HVS prior to component delivery. A Mass Only Assessment will also be required for super-loads (to be submitted to Main Roads HVS).

The Marri Wind Farm is expected to generate moderate traffic impacts during construction, with minimal long-term operational effects. With appropriate planning, road upgrades, and coordination with relevant authorities, the Project's transport requirements can be effectively managed.

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## Abbreviations

Abbreviation	Definition
AMC	Australian Marine Complex
BOD	Basis of Design
BYDA	Before You Dig Australia
DA	Development Application
DBNGP	Dampier to Bunbury Gas Pipeline
DPLH	Department of Planning, Lands and Heritage
GNH	Great Northern Highway
HV%	Heavy Vehicle Percentage
HVS	Heavy Vehicle Services
LT	Left turn
MOA	Mass Only Assessment
MRWA	Main Roads Western Australia
OEM	Original Equipment Manufacturer
OSOM	Oversize Overmass
RAV	Restricted Access Vehicle
RJA	Rex J Andrew Pty Ltd (transport operator)
RT	Right turn
RTAA	Road Train Assembly Area
TEC	Threatened Ecological Communities
TIA	Transport Impact Assessment
TMP	Traffic Management Plan
VPD	Vehicles per day
WAPC	Western Australia Planning Commission
WTG	Wind Turbine Generator

# 1 Introduction

## 1.1 Background

Marri WF Pty Ltd as trustee for the Marri WF Unit Trust (the Proponent) is proposing to develop the Marri Wind Farm project ('the Project'), within the Shire of Dandaragan ('the Shire'), Western Australia. Aurecon has been engaged by the Proponent to conduct a transport assessment as part of the Development Application (DA) submission, in accordance with the WA Planning Commission's (WAPC) Transport Assessment Guidelines (Volume 4 – Individual Developments).

The development will consist of up to 82 wind turbines installed across approximately 12,500 hectares, with an expected capacity of up to 550 megawatts and operating life of 35+ years. The project site will be located to the east of the Brand Highway, approximately 140 km north of Perth, near Dandaragan Road and Gillingarra Road.

The location of the project site is shown in Figure 1-1 (note red square along Dandaragan Road is separate facility outside of site area).

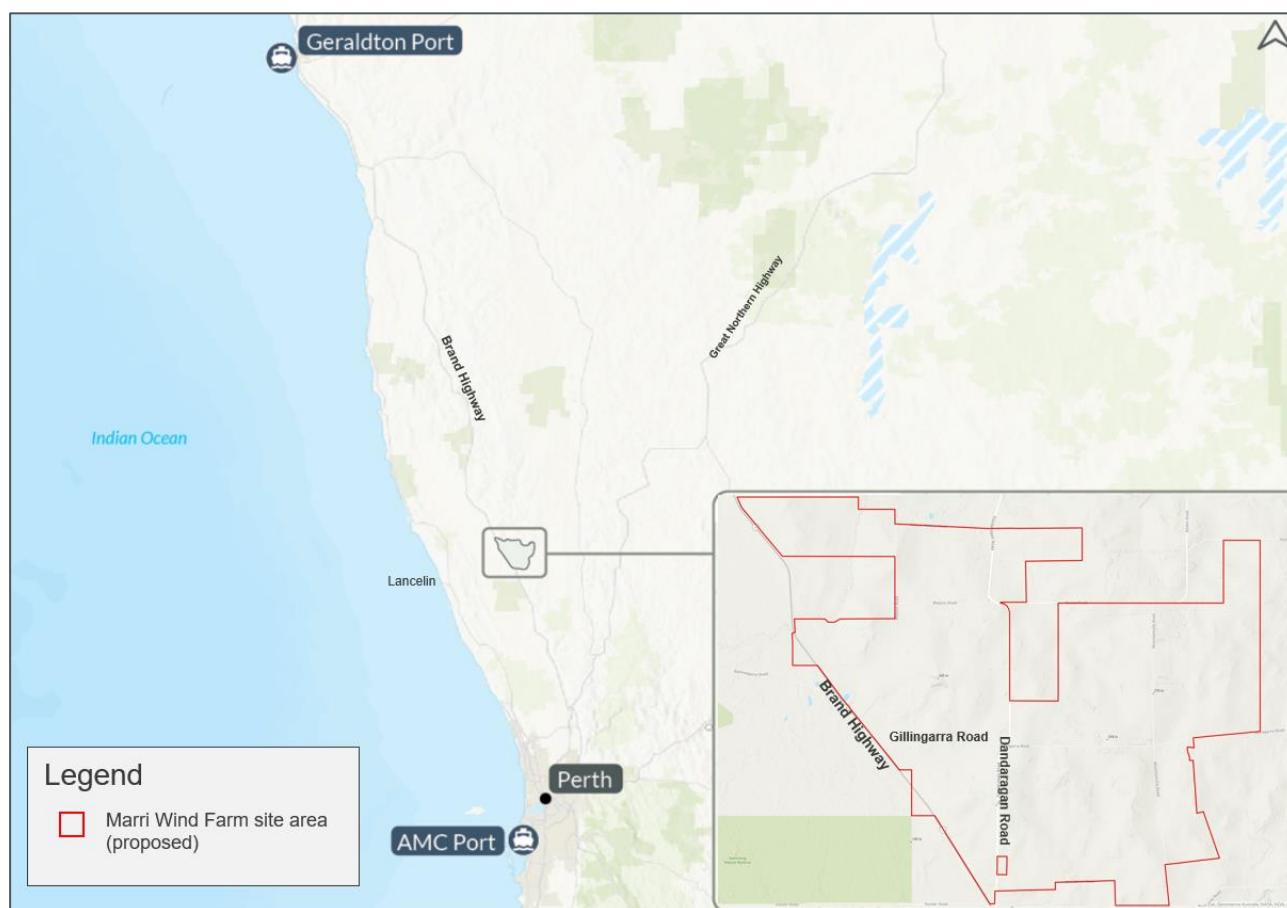


Figure 1-1 Marri Wind Farm site location (SOURCE: ARCGIS Pro 2023)

## 1.2 Purpose

The purpose of this report is to assess the impact of the Project on the operation of the surrounding road network. The transport assessment will be prepared in accordance with the WAPC Transport Assessment Guidelines (Volume 4 – Individual Developments). The Guidelines promote a three-level assessment process, where the required level of assessment is dependent on the likely level of impact (see Figure 1-2), as follows:

- Low impact – less than 10 peak hour trips, no assessment required

- Moderate impact – between 10 and 100 peak hour trips, Transport Impact Statement (TIS) required
- High impact – more than 100 peak hour trips, detailed Transport Impact Assessment (TIA) required.

Traffic and transport impacts associated with this form of development proposal are not standard or typical of urban-based development. Given this development, once opened, does not generate quantities of trips like that of a typical urban-based development (i.e. trips associated with residents or workers), the peak hour demand (i.e. period of highest traffic demand across a typical day) is not likely to have a high impact (i.e. generate trips greater than 100 trips per hour in the peak hour), or potentially even moderate impact. It is rather the impacts on the network from construction and initial commissioning that would represent the worst case scenario, and so are considered as part of this study.

The construction and commissioning phase will likely be spread out over ~24 months with some more intense periods of activity. Initial program indicates that construction activities will commence in early 2027 and conclude in early 2029. Given the extended construction timeframes, the expected construction trips generated are also typically less than the quantities of trips of a typical urban-based development with a high impact (i.e. generate trips greater than 100 trips per hour in the peak hour development). Therefore, a moderate impact is most likely associated with this type of development during construction.

While ultimately (during the operational stage) the development will likely have a low traffic impact, the development is expected to have a moderate traffic impact during the initial construction phase. Hence, a Traffic Impact Statement will have been prepared (this study).

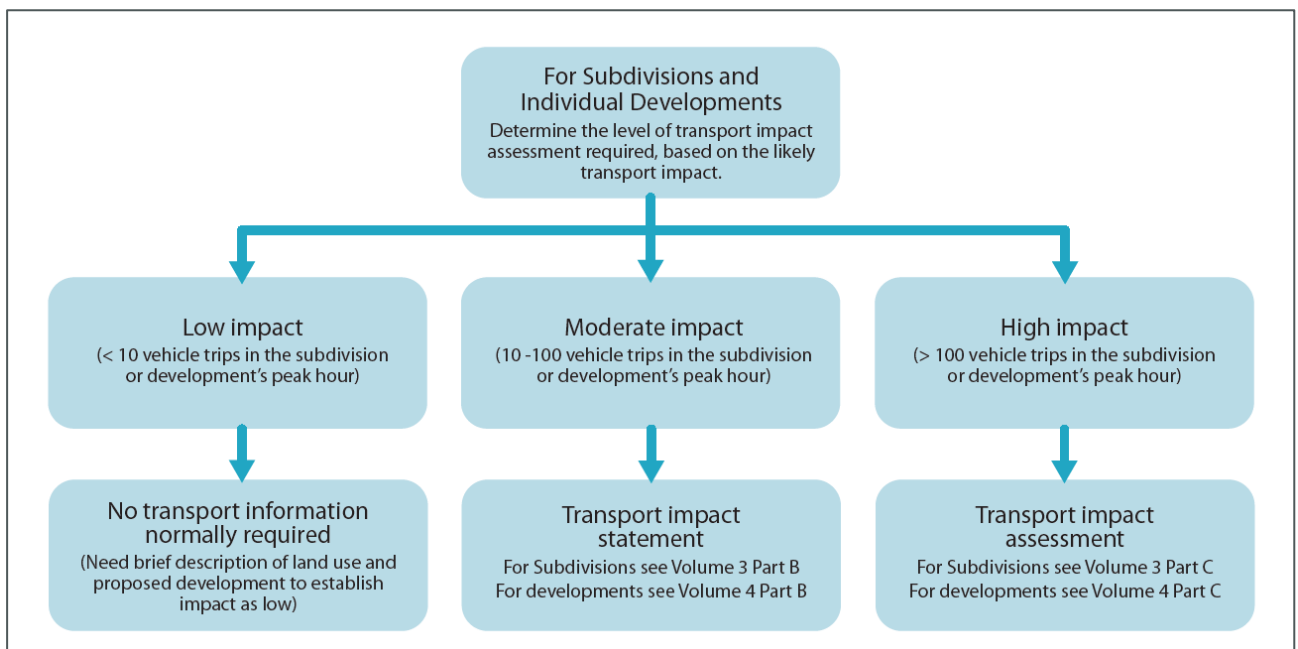


Figure 1-2 WAPC transport assessment requirements for individual developments

In addition to standard TIS requirements, Aurecon was also commissioned to undertake a preliminary route assessment on Oversize Overmass (OSOM) options for the transportation of wind turbine equipment from the nominated ports to site, to assist with the project construction planning. The key findings of the route assessment are also included within this report, as stipulated by Main Roads (see Section 5).

### 1.3 Disclaimer

- This report has been prepared with due care and is subject to assumptions, outlined throughout the report in the relevant sections, based upon information available at the time of writing.
- The review and assessment are based on information provided to Aurecon by other parties. Aurecon has not independently verified this information and does not accept responsibility or liability for any inaccuracies or shortcomings in this information.
- The review and assessment are provided strictly on the basis that the information provided is accurate.

- Should these information sources be modified by third parties, Aurecon assumes no responsibility for any resulting inaccuracies in its information.
- The transport assessment provides guidance to stakeholders involved in the development that can potentially impact on the safety, efficiency, or infrastructure condition of the state-controlled road network. It outlines the principles and the framework for undertaking a traffic impact statement and provides advice on mitigation strategies to address traffic impacts. This study is developed to the extent required for purposes of a traffic impact statement, but does not cover all aspects which could be required for a traffic impact assessment.

## 2 Existing site

### 2.1 Land use

The land within the project site is identified as 'rural' under the current Shire of Dandaragan Local Planning Scheme No.7 and is currently utilised for agricultural purposes. The adjacent land parcels are mainly zoned as rural with some areas zoned as nature reserves and for public purposes.

The land use within and surrounding the project site is depicted in Figure 2-1.

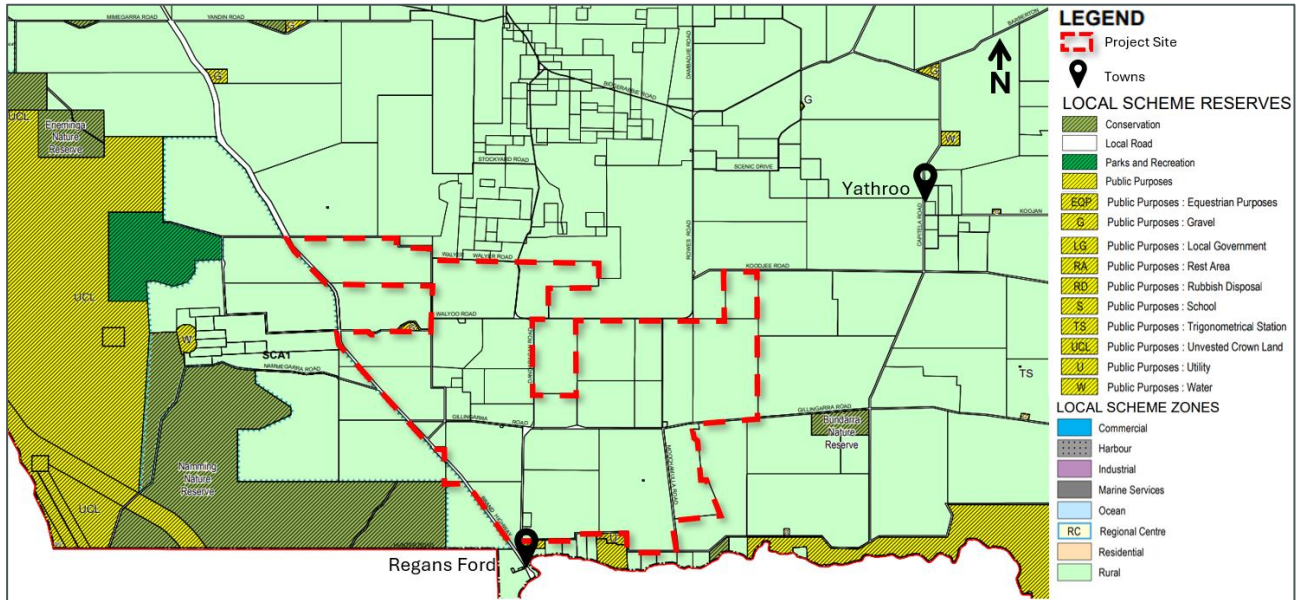


Figure 2-1 Existing Project Site land use zoning

A number of current and planned developments, including other large-scale projects, are known to be located in the vicinity of the project site. The known proposed wind farms in the region (Shire of Dandaragan and Shire of Gingin) are shown in Figure 2-2.

The closest proposed project is the Yathroo Wind Farm, which is immediately adjacent and to the north of the Project. It is understood at time of writing that the Development Application for Yathroo Wind Farm has been lodged and placed on public exhibition.

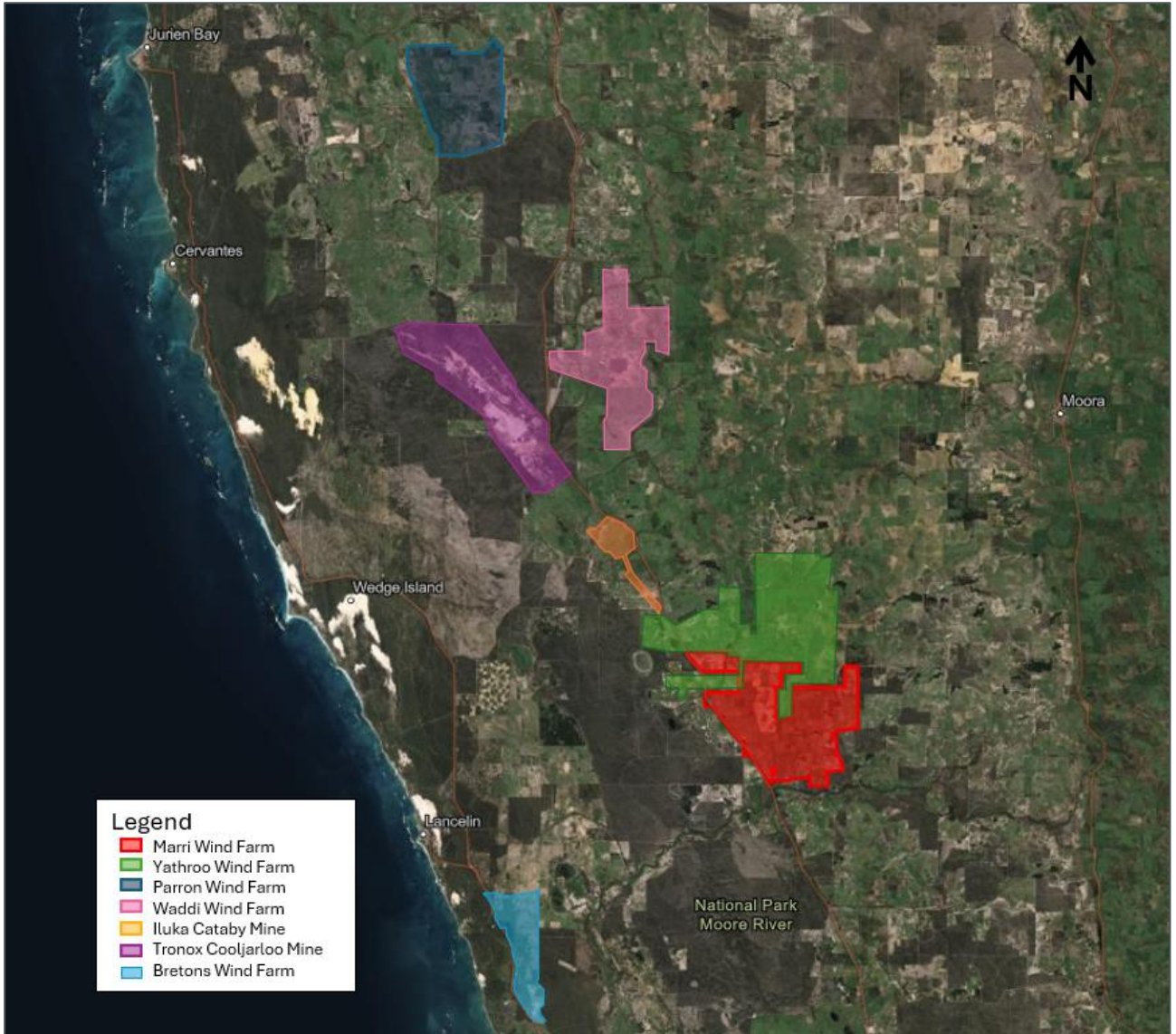


Figure 2-2 Nearby energy developments

## 2.2 Road network

The project site, existing surrounding road network and their road hierarchy as defined by Main Roads mapping information system, are shown in Figure 2-3. The nearest major road is Brand Highway (a primary distributor) that runs along the western side of the site in a north south direction. Brand Highway is a state-owned road, managed by Main Roads Gascoyne Region.

Various other lower hierarchy order roads operate within or directly adjacent to the project site, which are managed by the Shire. Of these, Dandaragan Road is of the highest order, shown as a regional distributor, followed by Rowes Road which is a local distributor. All other roads are classified as access roads, including:

- Gillingarra Road (accessed via Brand Highway)
- Mochamulla Road (accessed via Gillingarra Road)
- Walyoo Road (accessed via Dandaragan Road)
- Walyer Walyer Road (accessed via Dandaragan Road)
- Koodjee Road (accessed via Rowes Road)

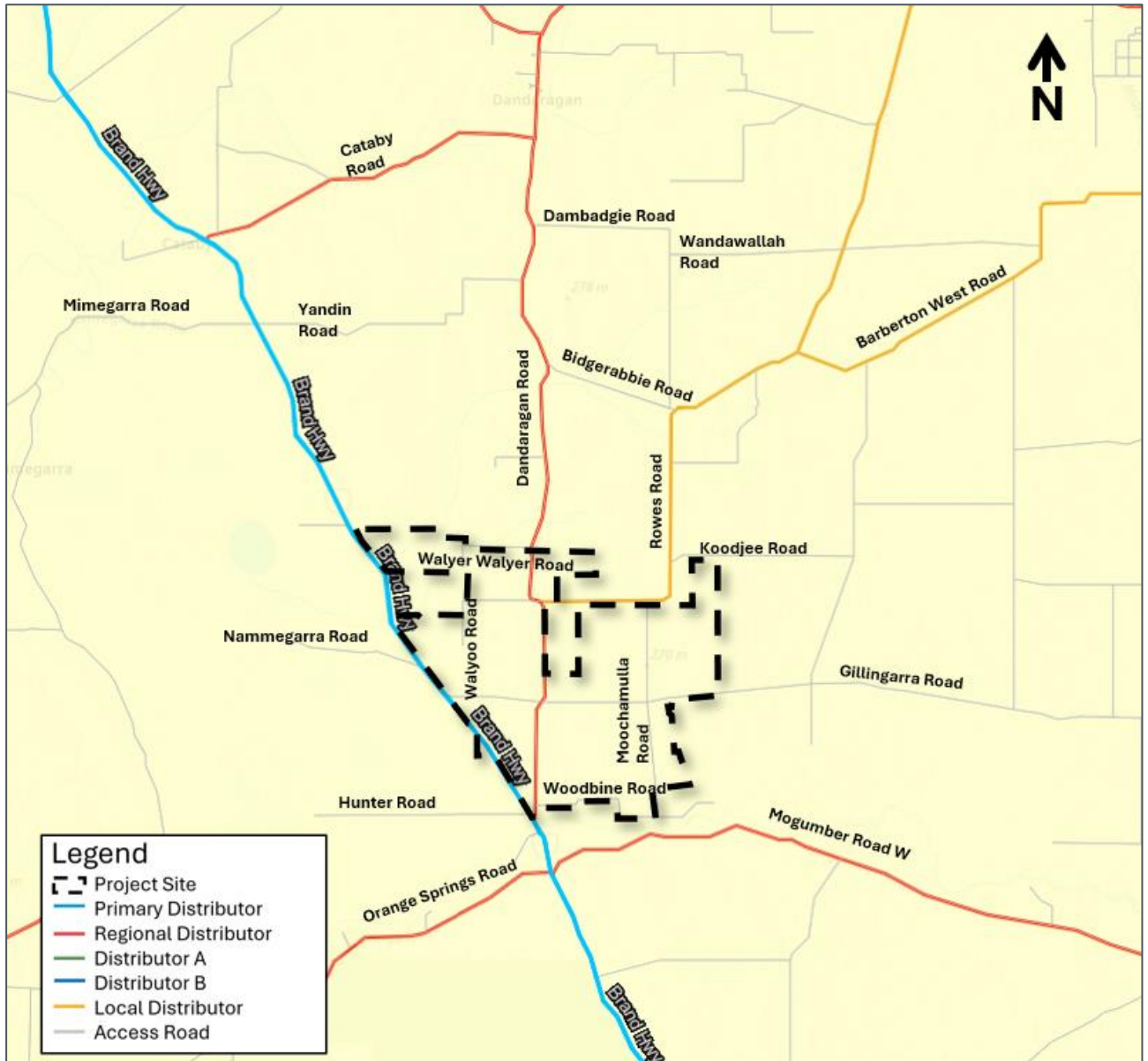


Figure 2-3 External road network - road hierarchy

Figure 2-4 shows the existing road network at the project site, with the shire roads proposed to provide access to the project internal access roads (i.e. provide access to the anticipated wind turbine sites) shown in green. Note, Woodbine Road is shown to have no direct access or connection within the site (as per landowner request), so is excluded from the assessment.

Two primary intersections are identified for site access off Brand Highway (State owned road), at Dandaragan Road and Gillingarra Road (see Figure 2-4). Secondary accesses are also identified off Brand Highway including a direct access to the substation (west side), and a turnaround facility further north. Note whilst all four locations along the Brand Highway are considered in this TIS, some locations may not eventuate in use (to be confirmed with subsequent stages of Project). The Yathroo Wind Farm site also proposes to utilise Dandaragan Road as the primary site access as outlined in their TIA submitted for DA, and mentions that there is potential for construction phase overlap and potential for cumulative impacts.

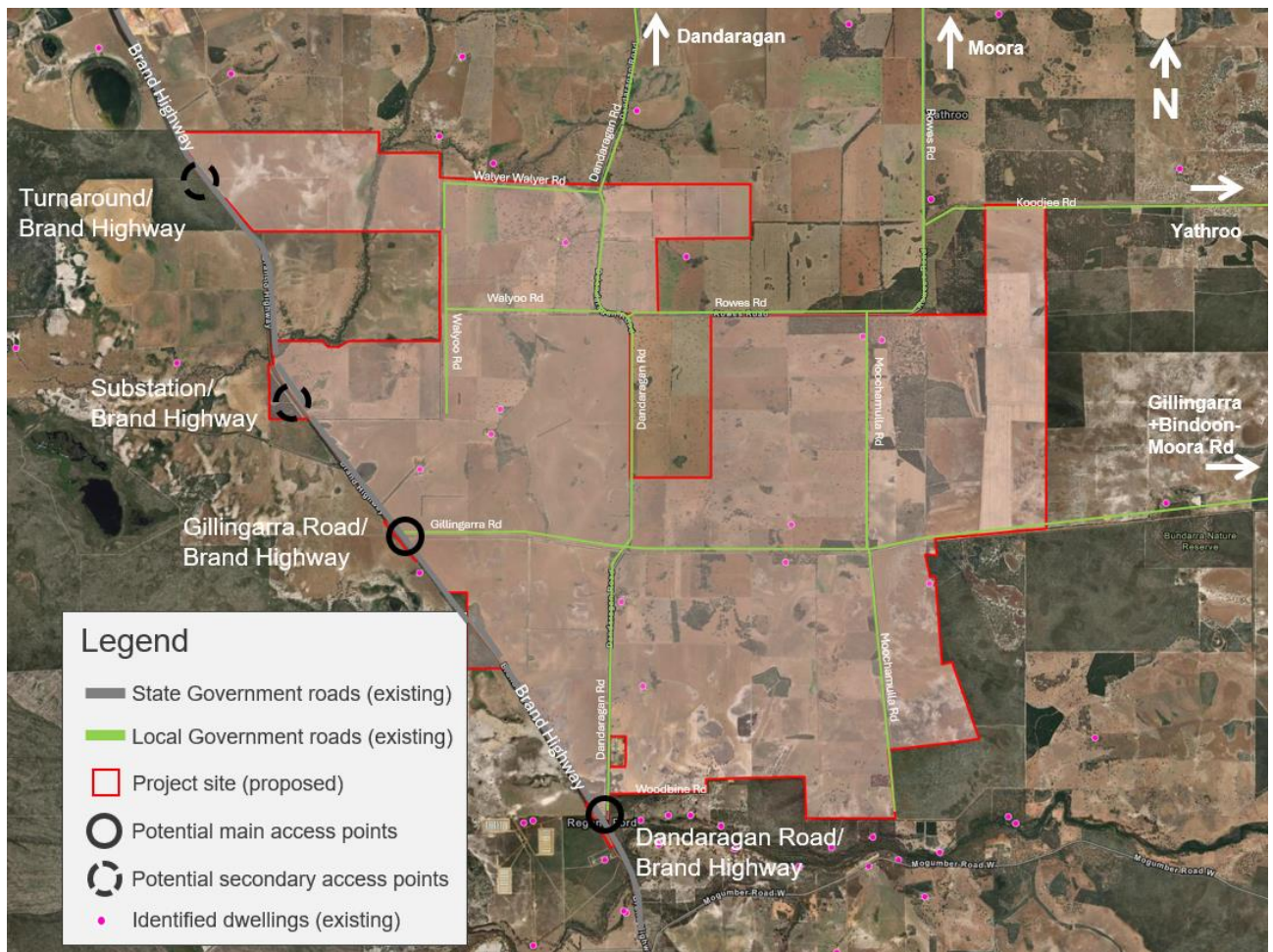


Figure 2-4 Existing situation and site footprint

Existing traffic volume data is available from the Main Roads Traffic Map website, with traffic counts and heavy vehicle splits available for Brand Highway, Rowses Road, and various segments of Dandaragan Road. Each relevant road is summarised below with available data in Table 2-1 (desktop assessment only) below.

Table 2-1 Road summaries

Road	Hierarchy	Road Characteristics	Road Reserve Width	Trafficable width
Brand Highway	Primary Distributor	Sealed two lane / two way	~100m	12m seal, 4m traffic lanes and 2m shoulders
Dandaragan Road	Regional Distributor	Sealed two lane / two way	~60m, North of Gillingarra Road ~20m	8m seal and 0.5m shoulders
Gillingarra Road	Access Road	Unsealed undivided / two way	~60m	~10m
Rowses Road	Local Distributor	Sealed two lane / two way	~20m	8m seal and 0m shoulders
Walyer Walyer Road	Access Road	Unsealed undivided / two way	~20m	6m
Moochamulla Road	Access Road	Unsealed undivided / two way	~20m	8m
Koodjee Road	Access Road	Unsealed undivided / two way	~60m	10m
Walyoo Road	Access Road	Unsealed undivided / two way	~20m	8m



Figure 2-5 Brand Highway looking south - Source: Google Street View, December 2022)



Figure 2-6 Dandaragan Road looking south – Source: Google Street View, July 2023 (Note more recent aerial imagery indicates this is now linemarked)



Figure 2-7 Gillingarra Road looking east – Source: Google Street View, July 2023



Figure 2-8 Rowes Road looking east – Source: Google Street View, July 2023



Figure 2-9 Walyer Walyer Road looking west – Source: Google Street View, July 2023



Figure 2-10 Moochamulla Road looking south – Source: Google Street View, July 2023



Figure 2-11 Koodjee Road looking west– Source: Google Street View, November 2023



Figure 2-12 Walyoo Road looking west – Source: Google Street View, July 2023

Based on initial consultation with the Shire, the following roads would require upgrade if they were to be utilised for the Project to transport heavy loads during construction (subject to further consultation).

- Gillingarra Road
- Walyer Walyer Road
- Moochamulla Road
- Koodjee Road
- Walyoo Road

Through consultation with Main Roads Gascoyne Region, the Project was informed that Brand Highway will be upgraded to the north and south of the project site, but not immediately adjacent to the site. However, the mentioned widening and overtaking lane construction could impact routes from both considered ports – AMC Port and Geraldton Port (as both are south and north of project site respectively). This will need to be considered as part of the Traffic Management Plan (TMP) to be developed by the transport operator closer to the time of the transportation task. The disclosed upgrades are listed below:

- Brand Highway - Widening from Badgingarra to Eneabba - 151 - 224 SLK (approved 2025/26). Located north of the project site.
- Brand Highway - Construct new overtaking lane - 166-169 SLK (approved 2025/26). Located north of the project site.
- Brand Highway - Extend Overtaking Lane -187-189 SLK (approved 2025/26). Located north of the project site.

- Brand Highway - Construct new overtaking lane - 36.70 - 39.20 SLK (Not yet approved – future FY). Located south of the project site.
- Brand Highway - Extend Overtaking Lane - 34.20 - 35.30 SLK (Not yet approved – future FY). Located south of the project site.

## 2.3 Traffic volumes

While traffic volumes were available for some roads (i.e. Brand Highway, Dandaragan Road and Rowses Road), no suitable data was available for the remaining local government (Shire) roads. As such, conservative estimates were developed based on the relative magnitude of traffic volumes on the adjacent roads, road classification and cross section, and the number of properties (i.e. magnitude of likely demand).

Along Dandaragan Road, the data shows there is a reduction in 2022/2023 traffic volume, from 304 vehicles per day (vpd) to 199vpd (see Figure 2-13). The intersecting roads along this section are Gillingarra Road and Rowses Road. Based on data from 2020-2021, Rowses Road recorded 92vpd thus, it is likely that this road caters for much of the traffic (i.e. which may explain the lower volume recorded). However, to keep the study conservative, a volume of 60vpd was applied to Gillingarra Road.

Note some traffic across the network would be seasonal based on harvesting and other farming activities. Whilst the existing traffic data available may already account for this traffic, additional traffic surveys would be required to assess this in more detail.

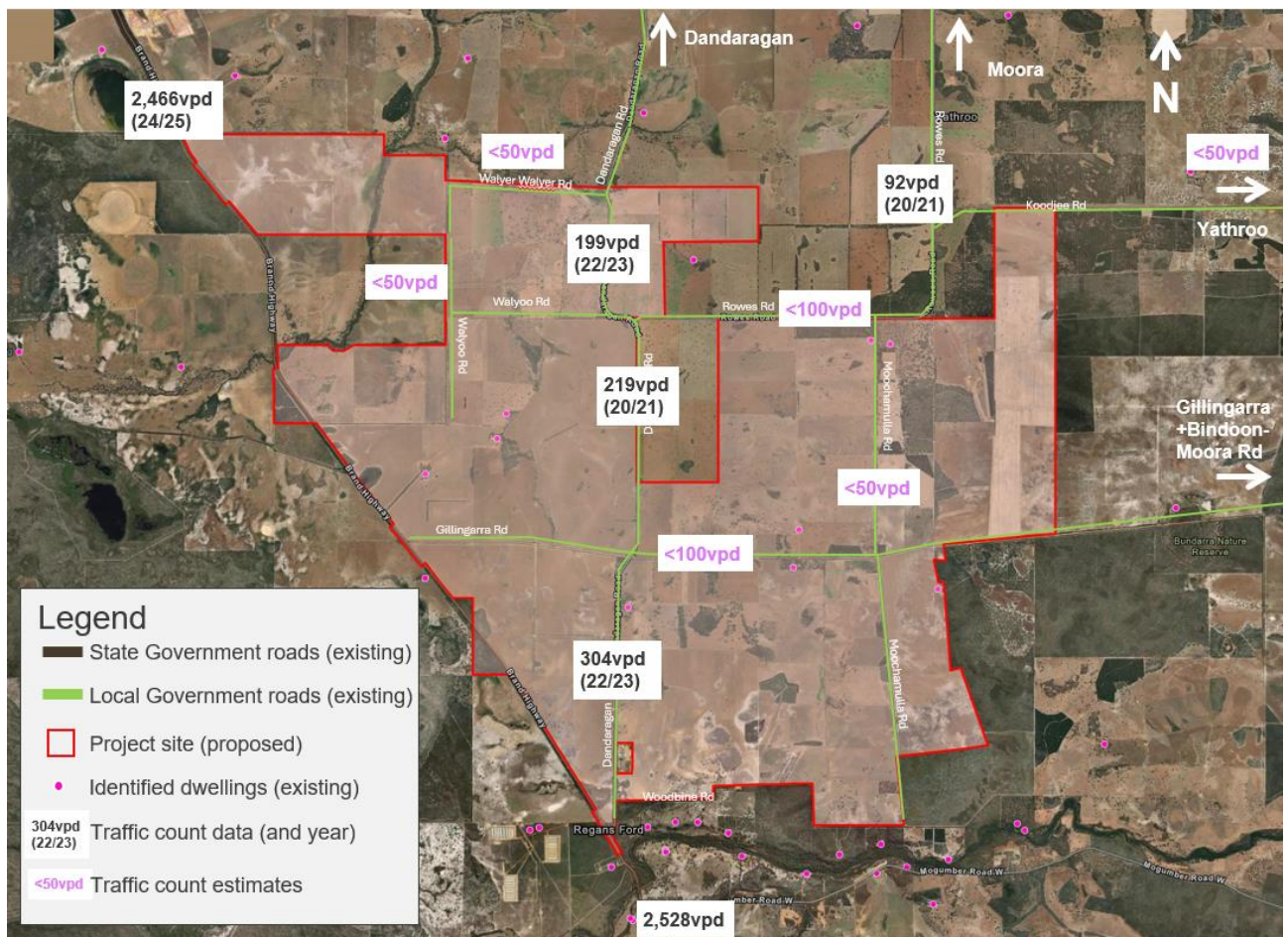


Figure 2-13 Base traffic buildup

The existing traffic data (see Table 2-2) suggests that heavy vehicles equate to a high proportion of traffic volume on the roads in this area. Whilst considered high, a heavy vehicle percentage (HV%) of 30% is assumed for the roads which do not have data available (as to generally align with roads which have traffic data). Note the roads which lack data are lower order roads, typically used to provide access for local farms and so may not see HV% of this magnitude, however for the purposes of this exercise is considered appropriate due to its conservativeness.

The traffic count for Brand Highway north of Dandaragan Road (rather than south of Mogumber Road) is adopted as there are no roads between these locations (to interfere with counts).

In addition to the above, the future 2029 traffic volume is estimated based on the base year available traffic volume, which is when project construction completion is expected. The 2029 traffic volume was calculated using a conservative growth rate of 2% per annum (compounding). For those roads with an estimated traffic volume, growth rate is applied from 2022 (i.e. 6 years of growth to get to 2028).

The base year and the estimated traffic volumes for the future base case are shown in Table 2-2.

**Table 2-2 Background traffic**

Road segment description	Base year traffic volume			Base case (2028)		
	Two-way traffic volume (vpd)	Heavy vehicle (HV)%	Traffic volume year	Two-way traffic volume (vpd)	HV%	HV (vpd)
Brand Hwy – (adopted count North of Dandaragan Rd)	2,466	28.4%	2024/2025	2,669	28.4%	758
Dandaragan Rd – East of Brand Hwy	304	32.2%	2022/2023	342	32.2%	110
Dandaragan Rd – South of Rowes Rd	219	38.8%	2020/2021	257	38.8%	100
Dandaragan Rd – North of Rowes Rd	199	17.6%	2022/2023	224	17.6%	39
Gillingarra Rd*	60	30%	N/A	<100	30%	<30
Rowes Rd	92	45.7%	2020/2021	108	45.7%	49
Walyer Walyer Rd*	10	30%	N/A	<50	30%	<15
Walyoo*	20	30%	N/A	<50	30%	<15
Moochamulla Rd*	20	30%	N/A	<50	30%	<15
Koodjee Rd*	40	30%	N/A	<50	30%	<15

\* No traffic data available so estimate only (conservative)

## 2.4 Active and public transport

The Department of Transport and Major Infrastructure cycling and walking plans maps, and the Shire of Dandaragan Path Network Plan 2022-2032 indicate that no existing or planned cycling or walking infrastructure is located at or immediately adjacent to the project site.

The N1 regional bus route operates along the Brand Highway (see Figure 2-14) with services passing the western edge of the project site twice a day. As shown in Figure 2-15, there is also a school bus route within the project site utilising Dandaragan Road, Moochamulla Road, Rowes Road, Gillingarra Road and Brand Highway.

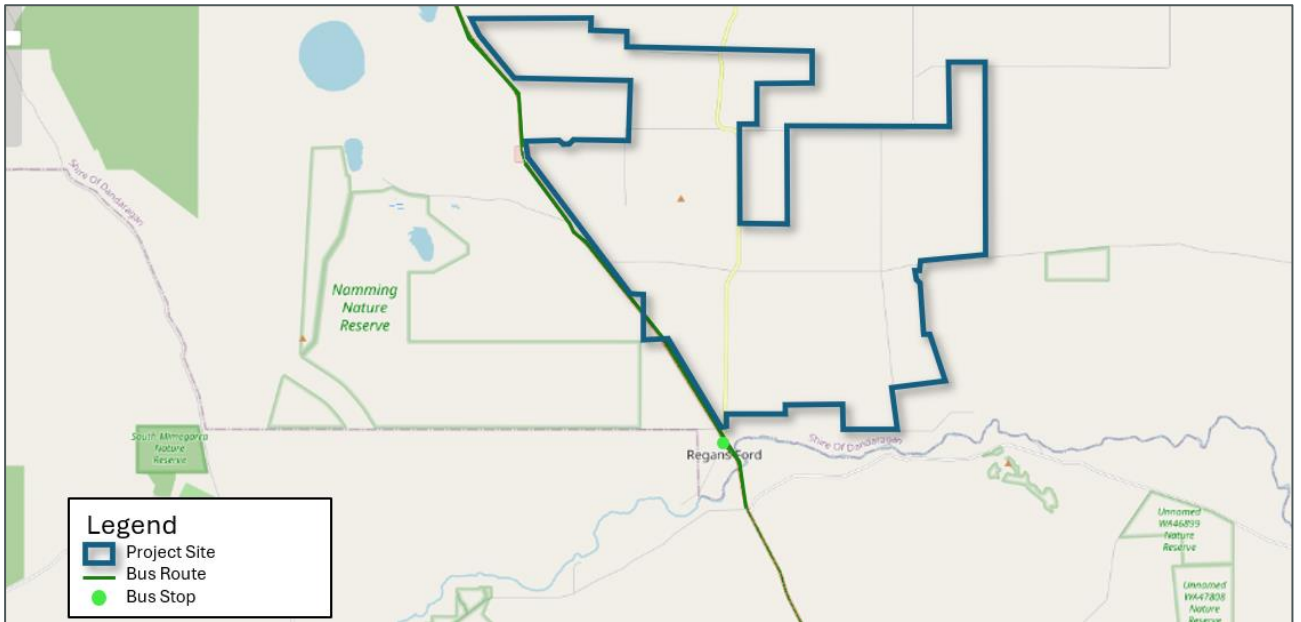


Figure 2-14 Public transport map (Source: data.wa.gov.au)

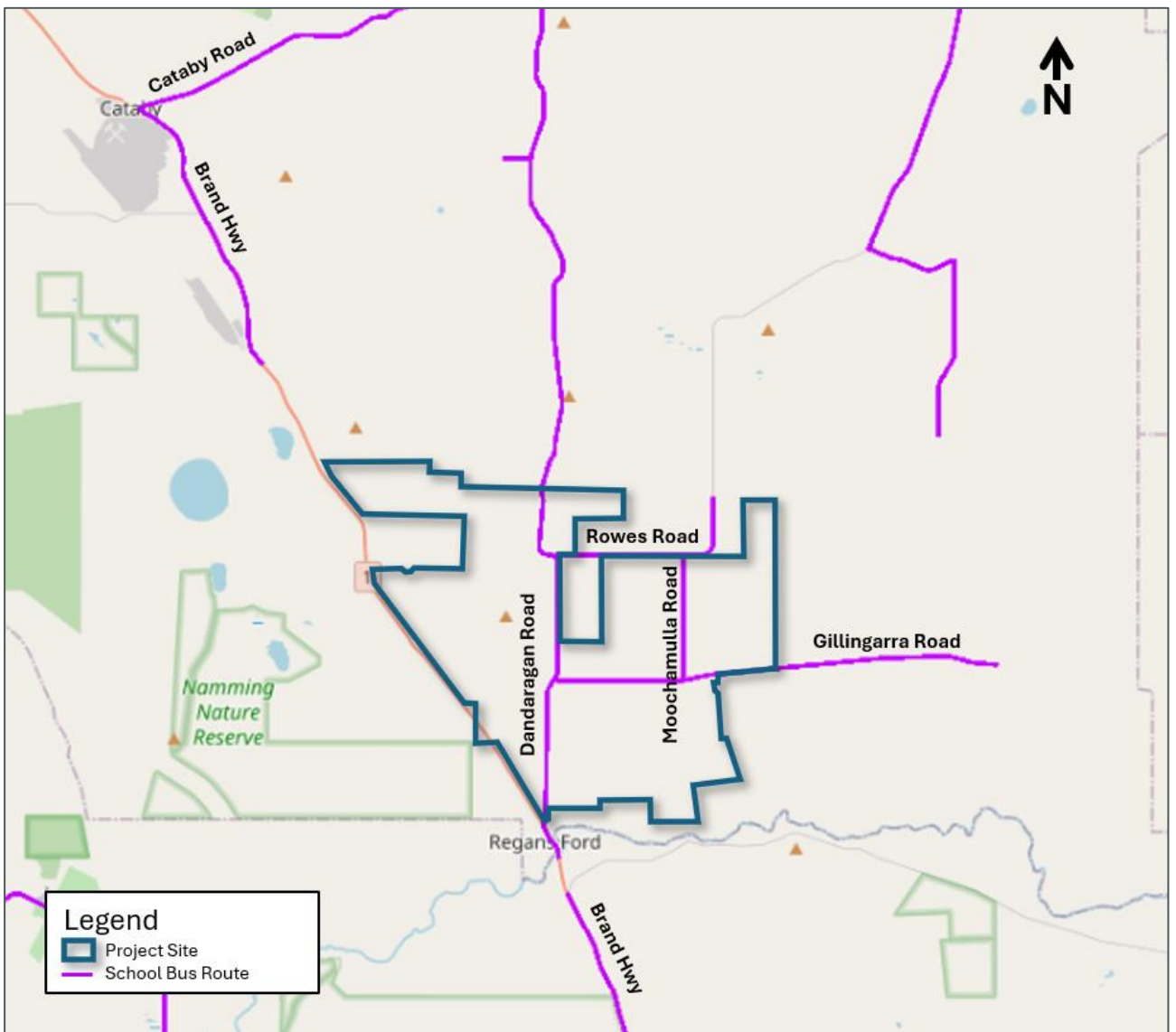


Figure 2-15: School bus routes (Source: data.wa.gov.au)

## 2.5 Freight network

The approved restricted access vehicle (RAV) routes of the relevant road links surrounding the project site have been summarised in Table 2-3 utilising Main Roads Western Australia's heavy vehicle service (HVS) mapping website. The highest order roads that service the Project are Brand highway, which is classified as N7 and TD4 and Dandaragan Road, which is N7 and TD2 south of Rowes Road and N7 and TD1 North of Rowes Road.

Based on discussions with the Shire, it is noted that Gillingarra would be expected to be upgraded to a higher classification, if it were to be used for the Project (to be determined e.g. RAV 7).

Table 2-3 MRWA RAV networks

Road Section	MRWA RAV Networks									
	Tandem Drive Network						Tri Drive Network			
	N2	N3	N4	N5	N6	N7	TD1	TD2	TD3	TD4
Brand Highway (South of Dandaragan Road)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Brand Highway (North of Dandaragan Road)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Dandaragan Road (Brand Highway to Rowes Road)	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗
Dandaragan Road (North of Rowes Road)	✓	✓	✓	✓	✓	✓	✓	✗	✗	✗
Gillingarra Road	✓*	✓*	✓*	✗	✗	✗	✓	✓*	✗	✗
Rowes Road	✓*	✓*	✓*	✓*	✓*	✓*	✓	✗	✗	✗
Koodjee Road	✓*	✓*	✓*	✗	✗	✗	✓	✗	✗	✗
Moochamulla Road	✓*	✓*	✓*	✗	✗	✗	✓	✗	✗	✗
Walyer Walyer Road	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗
Walyoo Road	✗	✗	✗	✗	✗	✗	✗	✗	✗	✗

\*With conditions

## 2.6 Crash history

A crash history analysis of the area was obtained from the Main Roads Crash database. The review of the data was narrowed to the road network directly adjacent to or within the project site from 19 February 2019 to 18 June 2023 (five-year period).

The dataset contains information on crashes reported to the police which resulted from the movement of at least one road vehicle on a road related area and includes records of fatalities, hospitalisation, medical treatment and minor injuries.

A total of 15 crashes have been recorded on the surrounding relevant network near the project site. The highest number of crashes occurred on the Brand Highway with 10 incidents including four hospitalisations, two requiring medical treatment and 4 that were property damage only. Only one crash occurred at an intersection, between Brand Highway and Harris Street.

Three incidents were recorded on Dandaragan Road including one fatality in 2021 which involved a driver leaving the road and striking a tree at 4:10am and two that involved property damage only. One crash was

recorded on Gillingarra Road which resulted in minor property damage only. The incidents mainly consisted of midblock accidents with only one occurring at an intersection. Figure 2-16 presents the locations of these crashes and their severity.

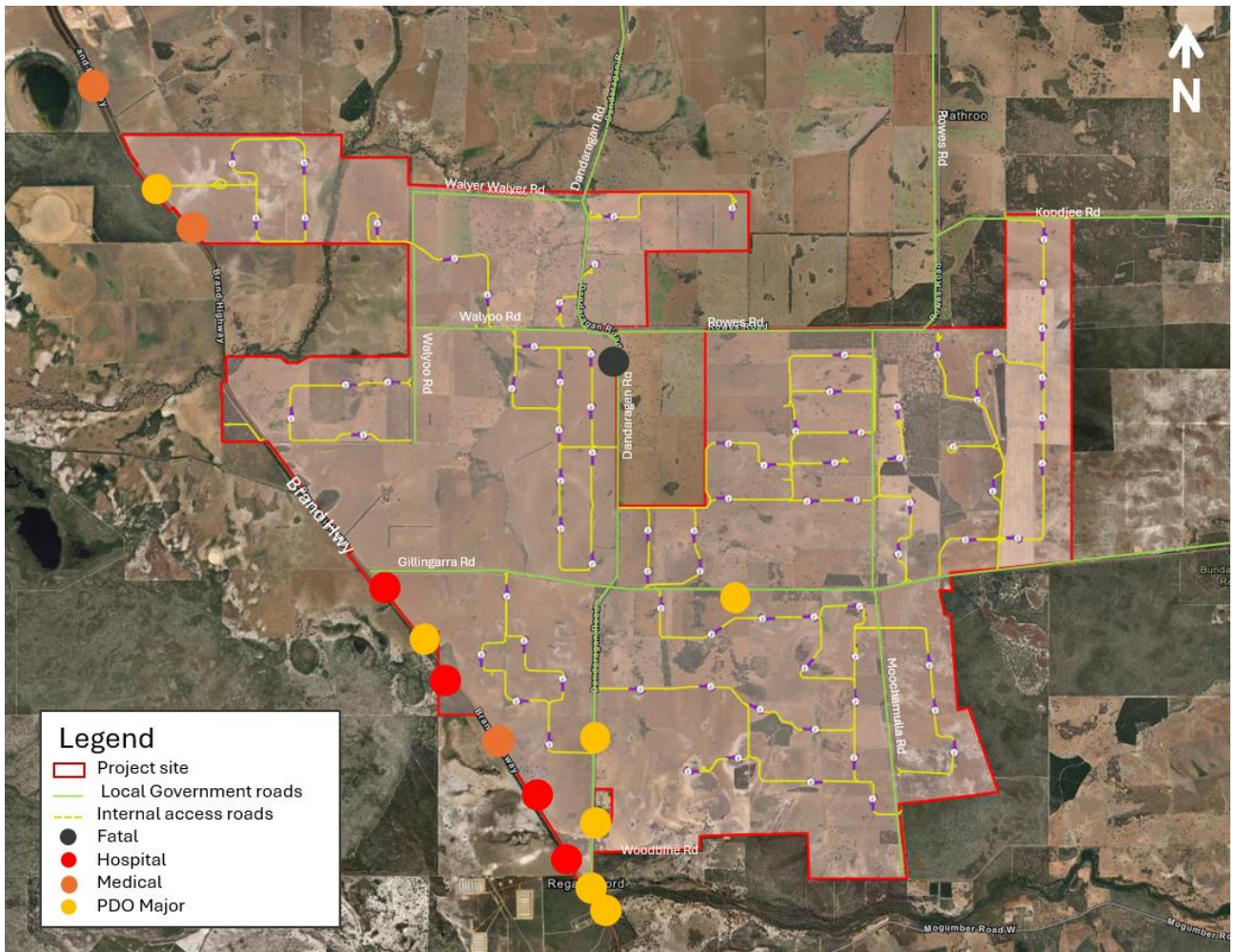


Figure 2-16 Crash map by severity (2019-2023)

A summary of crashes by year is shown in Figure 2-17. The highest number of accidents were recorded in 2020 and 2021 at five. The data also indicates the number of crashes has been generally decreasing since 2021.

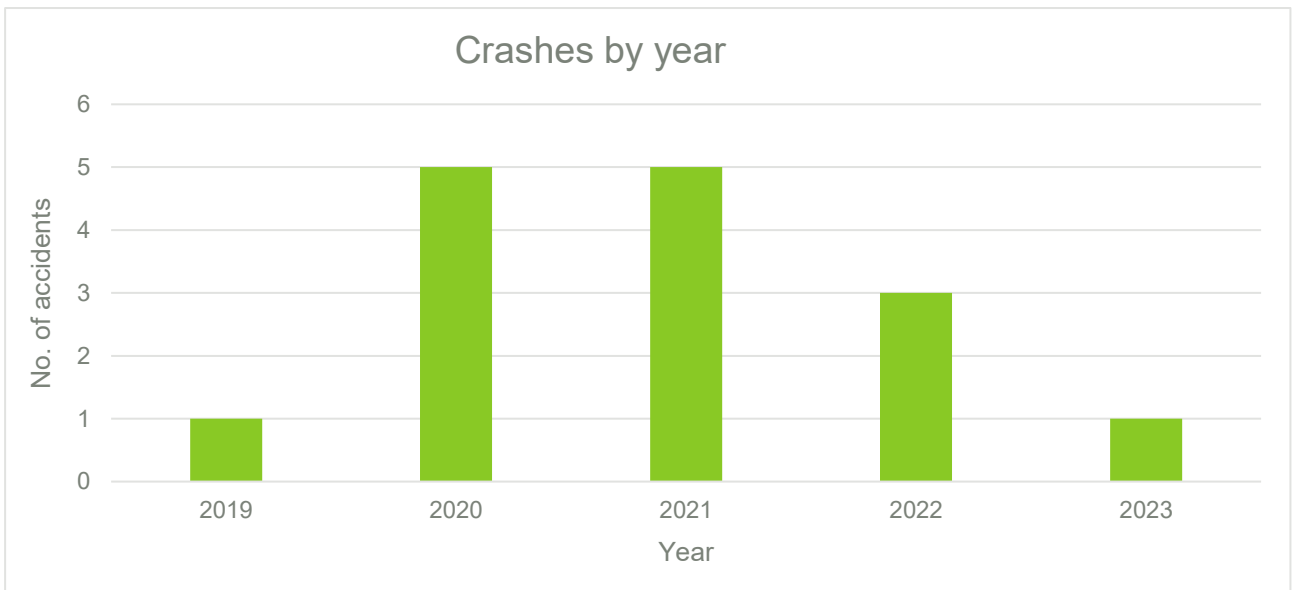


Figure 2-17 Crashes by year

## 3 Proposed development

### 3.1 Development site

The project site will be located to the east of the Brand Highway, approximately 140 km north of Perth, near Dandaragan Road and Gillingarra Road in Yathroo, Western Australia.

The Project will deliver 82 wind turbines, with an expected capacity of up to 550 megawatts and operating life of 35+ years. The proposed layout of the site is shown in Figure 3-1, with various use-specific sites proposed across the area. For example, gravel pits are shown across the project site as to source material, in addition to batching plants for producing concrete. A worker accommodation is also shown, designed for temporarily accommodating construction staff. A Battery Energy Storage System (BESS) is also shown located central to the site. A substation and satellite compound are also shown on the west side of Brand Highway north of Gillingarra Road, in addition to a temporary access and turnaround further north.

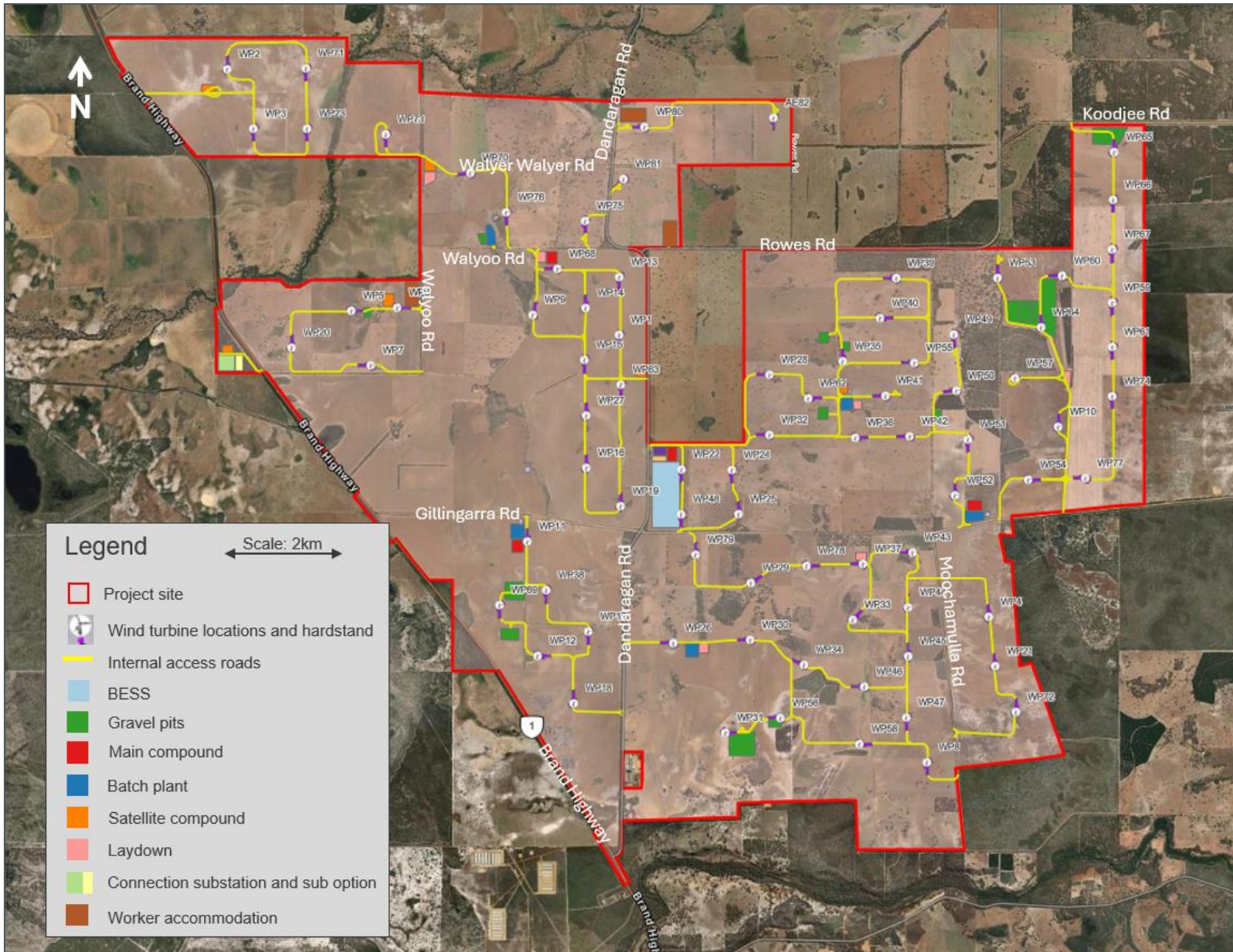


Figure 3-1 Proposed site layout

### 3.1.1 Site access

The primary access to the project site is proposed to accommodate vehicular access via local roads connecting to the Brand Highway through the Dandaragan Road and/or Gillingarra Road intersections. Direct access to the substation from the Brand Highway is also proposed, which is located on the west side of the road.

Based on preliminary desktop review, both Dandaragan Road and Gillingarra Road intersect Brand Highway at straight sections of the road and thus are assumed to achieve required sight distances. A more detailed safety review of the intersections impacted by the Project (including proposed internal access roads – subject to change) will be provided as development approvals progress. Mitigation measures (if required) will be proposed to ensure safe and efficient movement of heavy and light vehicles, including local and state-controlled roads.

As depicted in Figure 3-1, access to each turbine will be provided from the closest local road available. Each site access is to be designed and developed based on Main Roads requirements (refer to Section 4.1 for further details).

### 3.1.2 Parking and storage

The project site covers a total area of 12,500 hectares. Only a small percentage of the project site will be required to accommodate wind turbine and other infrastructure. It is anticipated that proximate laydown areas and parking will be able to be provided across the project site clear of any public roads as construction progresses. This is applicable to both construction and operational stages (albeit at a lower capacity for operational stage).

## 3.2 Construction program

The Project is scheduled to commence civil works in early 2027 and finish in early 2029. Works will begin with earthworks in February 2027, followed by the construction of the Wind Turbine Generators (WTG), which will start in May 2027.

Construction of the WTGs will be split between three stages, with approximately 27 wind turbine foundations in each stage. Each stage will include all aspects of the WTG construction, such as excavation, reinforced concrete foundations, and backfilling. These works are scheduled to conclude in May 2028, resulting in approximately 400 days of work.

Delivery of turbine components will begin in August 2027 and span to May 2028 (approximately 43 weeks or 300 days). It is expected that during construction and delivery, the site will operate 12-hour days, from 6 am to 6 pm, Monday to Sunday. The only exception will be for WTG foundation pours, which will require an earlier start (4 am) and a later finish (8 pm) to ensure completion.

## 3.3 Traffic generation

The average daily traffic generation was estimated from the below anticipated movements, across all stages of the Project from construction to decommissioning.

### 3.3.1 Staff

The Project's average personnel driving to site during construction is estimated to peak at 160 – noting that additional staff will be accommodated on site. Construction workers may be housed in nearby towns (i.e. Lancelin (54 km away) / Gingin (50 km away)) or accommodated within a purpose-built temporary village within the boundary of the project site (with an anticipated capacity of up to 450 people on site).

The final location for staff accommodation is still being reviewed. However, it is expected that there will be a concentration of construction staff residing temporarily in set areas which provides opportunities to share transport for daily trips to and from the project site.

In the scenario that workers are accommodated on site, the camp would be required to provide ~450 single rooms in modular buildings and feature essentials such as kitchen & dining hall (capacity for ~300 seats per sitting), laundry facilities, bathroom blocks (toilets, showers), recreation room/gym, medical/first aid room, administration/office space, utilities & services, power generation (diesel gensets or hybrid), water storage & treatment, wastewater treatment plant and a management system.

Such layout would need to be transported in semi-trailers during the initial stages of the project (potentially before delivery of equipment commences). However, for conservativeness, it has been assumed that at least two (2) heavy vehicles per hour would travel to the site.

Otherwise, if all 160 staff were bussed to and from the project site this would suggest seven 25-seat busloads of workers in the morning and seven at the end of the day. Nonetheless, it is recognised that while bus transport may be suitable and encouraged for much of the construction workforce there will be a proportion that will require personal transport and/or choose to share smaller private vehicles.

For the purpose of this assessment and for conservativeness, it has been assumed that 25% of the 160 construction workers would travel to and from via car with the remaining workforce either travelling to or from the project site by bus or as passengers in private vehicles.

On the basis of the above, it is assumed that at peak construction activity (considering the worst case scenario wherein 160 workers travel to site) the workforce would generate approximately 40 light vehicle and seven (14) bus movements per day (assumes buses do not remain on site between arrival and departures times) and will frequent the site from February 2027 to January 2029.

### **3.3.2 Earthworks**

Two earthworks' crews will be responsible for constructing the access tracks, laydowns, and hardstands. Each crew will typically consist of:

- Grader
- Loader
- Dozer
- Two rollers
- Two watercarts
- Two Moxy dump trucks

Given that at this stage, the extent of mobilising/demobilising these equipment is unknown, it has been estimated that these movements may demand up to 8 heavy vehicles per day over three days (for each mobilisation and demobilisation), or ~one heavy vehicle per hour at its peak. These movements may repeat through the course of the Project as construction of tracks, laydowns and hardstands may be needed at different key locations as to provide convenient access to construction vehicles.

Additional equipment, such as semi-tippers or 8-wheeler tip trucks, may be needed to transport fill materials from/to borrow pits or cut stockpiles. At this stage, it is anticipated that haulage of earthworks will be delivered at a rate of up to 8 vehicles per day, or one per hour, during at approximately 12 months.

### **3.3.3 Service vehicles**

The crews will work across all three stages and will be supported by vehicles such as fuel trucks and fitters' trucks. Throughout the Project's construction stage, there will also be daily/weekly deliveries to site for various consumables, waste removal and other services. These services are estimated to be delivered at a rate of ~two (2) vehicles per day over the duration of the entire program (730 days).

### **3.3.4 Cranes mobilisation and demobilisation**

For crane activities, it is expected approximately 200 heavy vehicle movement for mobilisation and the same number for demobilisation. These activities are estimated to result in up to two (2) heavy vehicle movements per hour if considered to be delivered within a ~ two-week window, noting that this information is indicative pending a more defined project assessment.

### 3.3.5 Concrete

The Project will require approximately 109,000 cubic meters of concrete to be poured across the entire site, with each turbine footing requiring about 1,200 m<sup>3</sup> (including blinding). This translates to about 42,000 individual concrete truck return movements. Each turbine foundation pour will also require two concrete pumps and between five (5) to 15 concrete trucks, depending on the distance from the batch plant.

Five concrete batching plants are provided across the site, which will operate 16 hours per day / 7 days per week. It is assumed that the batching plants closest to each WTG will be used to provide the concrete for footings etc. On the basis of the advised amount of concrete required for each WTG, it is assumed that 105 return trips per day (i.e., 3 - 4 trucks per hour) over 400 days<sup>1</sup> will be required. It is noted that majority of these movements will largely occur within the overall site area, rather than entering from Brand Highway (i.e. external to site).

### 3.3.6 Steel reinforcement

Additionally, around 10,500 tons of steel reinforcement will be installed, requiring approximately 400 semi-truck deliveries to site (i.e. 800 return trips). This reinforcement will likely be delivered to a central or satellite laydown area before being transported to the individual WTG work fronts using smaller site trucks.

Delivering under the same timeframe, this would indicate that a movement of ~one (1) truck load per day when considering each truck would carry around 26.5tn and deliveries will span over 12hrs per day, 7 days per week and 400 days of work.

### 3.3.7 Components and parts

Large components of the wind farm will be transported by OSOM vehicles, with a peak construction activity up to 28 OSOM deliveries expected per week between August 2027 and May 2028, resulting in approximately 2,400 return trips. This would equate to an average of four (8) vehicles per day (12 hours/day, 7 days/week over 300 days), or at least one (1) vehicle during peak hours.

For reference, an estimate to the breakdown of wind turbine components is summarised in Table 3-1.

**Table 3-1 Wind turbine components mass (Goldwind specifications)**

Wind turbine component	Number of trips
Towers and accessories (bottom to top)	492-656*(depending on final tower configuration)
Blade	246
Nacelle	82**
Hub	82
Drivetrain and generator	82

\*Could be up to 8 tower sections for 150m hub height (based on knowledge from previous projects – to be confirmed)

\*\*Number of trucks required varies significantly across suppliers

The longest typical transport vehicle during construction of the Project is the blade transport truck. The specific Original Equipment Manufacturer (OEM) supplier is yet to be confirmed, however the worst case (i.e. the largest shortlisted wind turbine) has been selected for assessment purposes. This consists of a 91m blade length and truck combination length of 103.1 metres (m). Overhead heights restrictions were also considered, with the transportation of the tower components requiring an alternative route to blade transportation for AMC Port to the project site (up to 6.8m overhead clearance required). Refer to Section 5 for further details.

### 3.3.8 Electrical components

Electrical infrastructure may include underground cabling, overhead transmission lines, substations, and electrical connections. It is anticipated that electrical components could require the use of semi-trailers at a rate of up to 8 vehicles per day during peak installation. While these deliveries are expected to be carefully

<sup>1</sup> assuming 5-6m<sup>3</sup> per truck

scheduled to optimise the movement of heavy vehicles within and around the site, a worst-case scenario of two (2) heavy vehicles per peak hour are considered to provide a conservative analysis. It is also assumed that these components will be delivered in a timeframe of 20 days.

### 3.3.9 Summary of total demand

A summary of the expected traffic demand of the Project is presented below in Table 3-2. It is noted that for the purpose of the study, the below summary considers the highest number of the estimated ranges for conservativeness.

The vehicles per hour (Peak) estimate considers the worst-case scenario assuming all movements may overlap at a given time, considering this as the greatest impact to the network for the purpose of this assessment and verification against the WAPC transport assessment guideline.

Table 3-2 Summary of construction vehicles demand

Vehicle description	Expected duration (days)	Vehicles per hour (peak)	Vehicles per day (return trips i.e. enter and exit)	Total (return trips)
<b>Light vehicles (6am – 6pm)</b>	<b>730</b>	<b>40</b>	<b>80</b>	<b>4,560</b>
<b>Heavy vehicles (6am - 6pm)</b>				
Earthworks (mobilisation and demobilisation only)*	3 (each)	2	16	48
Earthworks (haulage)	365	2	16	5,840
General services (Consumables, waste, etc)	730	1	4	2,920
Craneage (mobilisation and demobilisation only)	14 (each)	2	28	392
Concrete mixers (4am – 8pm)	400	4	105	42,000
Reinforcement	400	1	2	800
Staff buses	730	5	10	7,300
Electrical components	20	2	16	320
<b>Total Heavy Vehicles</b>		<b>19</b>	<b>197</b>	<b>59,620</b>
<b>Main components and containerised parts (OSOM)</b>	<b>300</b>	<b>1</b>	<b>8</b>	<b>2,400</b>

\*Schedule of earthworks and craneage movements are yet to be confirmed, as such, the total indicates only the worst-case scenario. These movements are likely to occur several times as project progresses.

Based on the analysis, it is considered that at peak construction activity periods, workers at the site will generate approximately 40 movements during a peak hour, while approximately 19 heavy vehicles and 1 over-dimensioned vehicle per hour are anticipated to access the area and then disperse to the different active work sites.

This level of traffic is within the threshold of a Moderate Impact (10-100 Vehicles per Hour) as defined by the WAPC Transport Assessment Guidelines (Volume 4 – Individual Developments).

Refer to Site Access Review (Section 4) for swept path assessments at main intersections and key turns.

### 3.3.10 Operation and maintenance phase

It is anticipated that the Project will have minimal traffic demand during the operational phase, generating only a few movements per day as the site will require reduced staff to operate, and occasional heavy vehicles for maintenance.

The site will only require routine checks, occasional deliveries, and maintenance checks. In the rare occurrence, a maintenance or emergency vehicle will be required. Specific operational plans and Traffic Management Plans will be developed for deliveries, maintenance and emergency events. Thereby, the

increased traffic due to operation of the Project is expected to be negligible and easily accommodated by the transport network.

Access for this reduced traffic will continue to be provided via the surrounding local roads through the Dandaragan Road and/or Gillingarra Road connections to the Brand Highway.

### **3.3.11 Decommissioning phase**

Once operational, the site is expected to remain in use for over 35 years. The traffic impact during the decommissioning phase is anticipated to be lower than during construction. However, a separate traffic assessment will be conducted at the time of decommissioning.

## 4 Site access review

A review of the site access and internal roads was undertaken, as part of the Route Assessment and Site Access Review (see Appendix C). A summary of the general quantum of WTGs and other facilities that are connected by each road is shown in Table 4-1. It is noted that the port of entry is not yet confirmed (see Route Assessment in Section 5), and this will impact what direction OSOM movements will access the project site from. Therefore, this would need to be revisited at subsequent stages of the Project. For completeness, access from both directions (i.e. north for Geraldton Port and south for AMC Port) are considered below.

A swept path analysis with the largest heavy vehicle combination was undertaken for the Site Access Review to identify the impacts on the road network that require further consideration (i.e. may require upgrades to accommodate vehicle swept paths). This consists of a swept path analysis of a 91m turbine blade length and truck combination length of 103.1m, and a 190 tonne transformer and truck combination length of 44m. Note swept path analyses of general heavy vehicles (for construction and operational phases) will be required at subsequent stages of Project to inform intersection upgrade requirements.

Impacts to vegetation are discussed in this section noting that references to 'significant' vegetation throughout this document refers to previously mapped or newly recorded instances of Threatened Ecological Communities (TEC).

**Table 4-1: Roads and site connections**

Road	WTGs no. (approximate)	Other facilities (approximate)
Dandaragan Road	28	<ul style="list-style-type: none"> <li>■ Batch plants</li> <li>■ Gravel pits</li> <li>■ Main compound</li> <li>■ BESS</li> <li>■ Worker accommodation</li> <li>■ Laydowns</li> </ul>
Gillingarra Road	32	<ul style="list-style-type: none"> <li>■ Batch plants</li> <li>■ Gravel pits</li> <li>■ Main compound</li> <li>■ Laydowns</li> </ul>
Rowes Road	0	<ul style="list-style-type: none"> <li>■ Worker accommodation (alternative option)</li> </ul>
Walyer Walyer Road	5	<ul style="list-style-type: none"> <li>■ Satellite compounds</li> <li>■ Laydown</li> </ul>
Moochamulla Road	11	<ul style="list-style-type: none"> <li>■ Laydown</li> </ul>
Koodjee Road	5	<ul style="list-style-type: none"> <li>■ Gravel pits</li> </ul>
Walyoo Road	4	<ul style="list-style-type: none"> <li>■ Batch plant</li> <li>■ Gravel pits</li> <li>■ Main compound</li> <li>■ Satellite compound</li> <li>■ Laydown</li> <li>■ Worker accommodation (alternative option)</li> </ul>
Brand Highway	0	<ul style="list-style-type: none"> <li>■ Connection substation and sub option</li> <li>■ Satellite compound</li> </ul>

## 4.1 Key intersections

As stated previously, it is anticipated that the primary intersection for access to the project site area will be from Brand Highway via either Gillingarra Road or Dandaragan Road (see Figure 4-1).

Direct access to the substation from the Brand Highway is also proposed, in addition to the turnaround facility to the north. A desktop geometric review of each intersection has been undertaken in relation to its design and layout to accommodate construction vehicles (worst case only) and is summarised in the following sections.

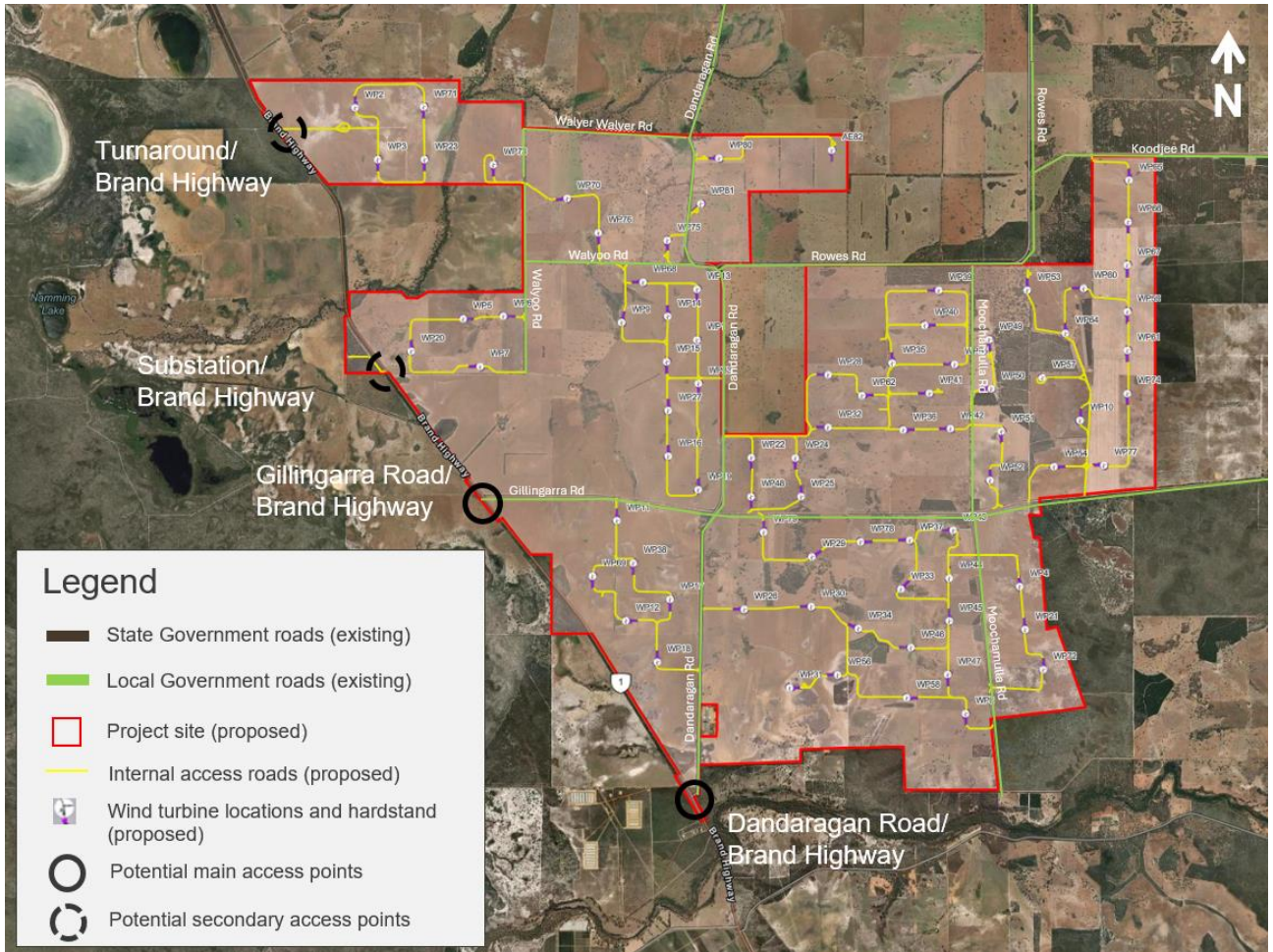


Figure 4-1 Site access

### 4.1.1 Dandaragan Road

The existing T-intersection consists of dedicated turn lanes and splitter islands (Dandaragan Road is RAV 7). The test vehicle swept paths are shown below in Figure 4-2 (blade transport combination). From this assessment, it is identified that there are impacts to vegetation classified as 'significant' when accessing Dandaragan Road, from both the north and south. Temporary hardstand would also be required to facilitate the movements.

Note temporary closure of impacted traffic lanes would be required with management from traffic wardens (to be established in separate OSOM TMPs as per Main Roads Heavy Vehicle Services requirements)

Furthermore, the southeast corner at Dandaragan Road would need to consider drainage infrastructure if upgraded (based on consultation with Main Roads Gascoyne).

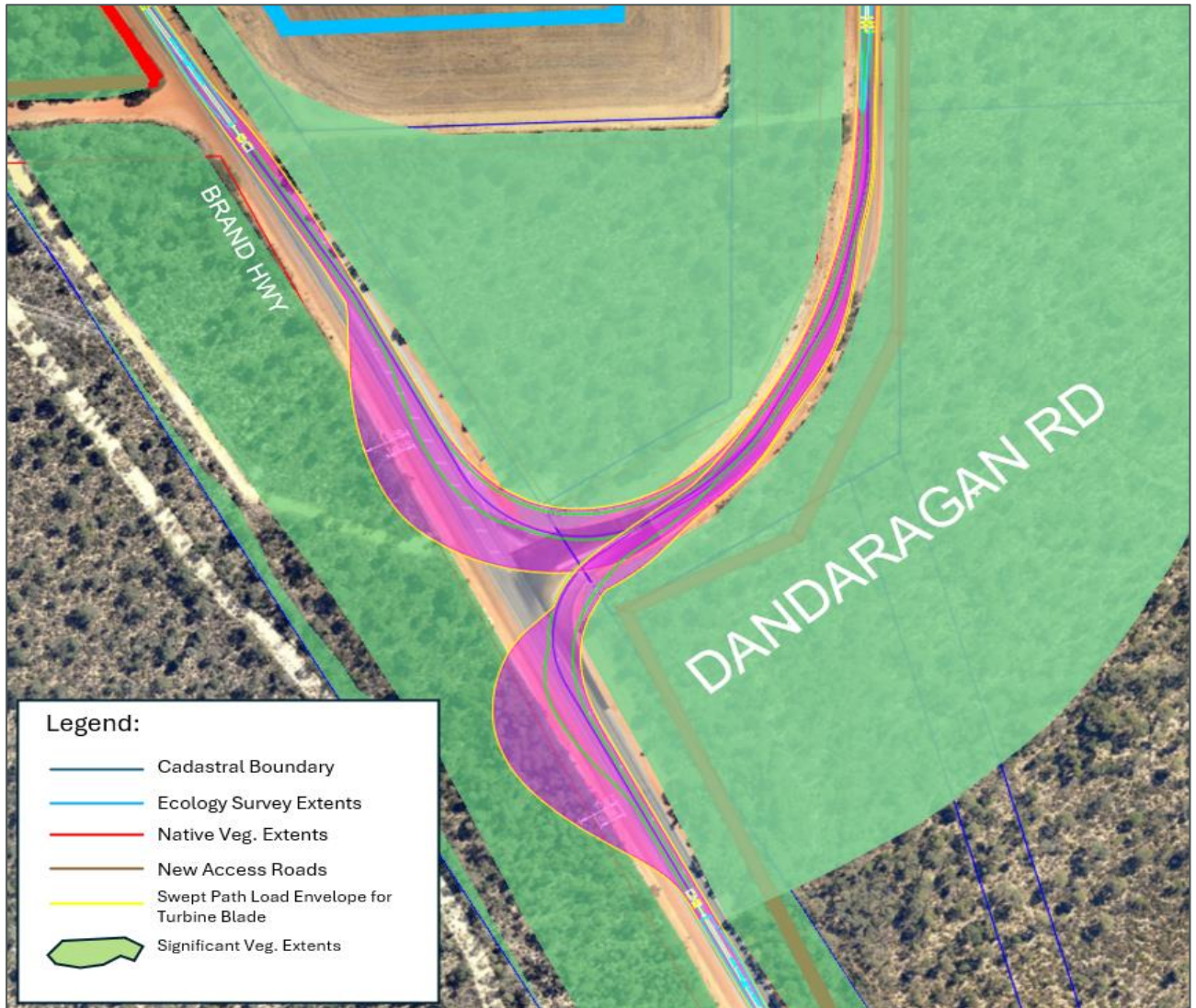


Figure 4-2 Dandaragan Road/ Brand Highway swept path analysis

#### 4.1.2 Gillingarra Road

The existing T-intersection at the Brand Highway and Gillingarra Road is of a low standard without dedicated turn lanes or splitter islands, and connects to Gillingarra Road, which is unsealed. As per consultation with the Shire, if Gillingarra is to be used for the Project, it would require upgrades to a standard similar of Dandaragan Road (e.g. 8m seal and 1m shoulders).

Should this be the case, upgrades would also be required to this intersection, which may be stipulated by Main Roads to be of a similar standard to that at Brand Highway/Dandaragan Road (equivalent to Main Roads Standard Drawing 201431-0001-7 – see Appendix C).

Note the addition of turn lanes would result in additional width required along sections of the Brand Highway, which could result in further implications with 'significant' vegetation clearing at this location (further consultation with Main Roads Gascoyne Region required).

The test vehicle swept paths are shown below in Figure 4-3 (blade transport combination). From this assessment, it is identified that vegetation classified as 'significant' is impacted when accessing Gillingarra Road from the south but is not the case when accessed from the north. However, clearing of native vegetation would be required with varying extents to allow access from north and south. Furthermore, temporary hardstand would be required for either movement. Temporary closure of impacted traffic lanes would be required with management from traffic wardens (to be established in separate OSOM TMPs as per Main Roads Heavy Vehicle Services requirements).

The Before You Dig Australia (BYDA) search indicates that the building on the southeast corner is a fixed constraint, associated with power utilities. Therefore, this is avoided in the swept path, including the fence.

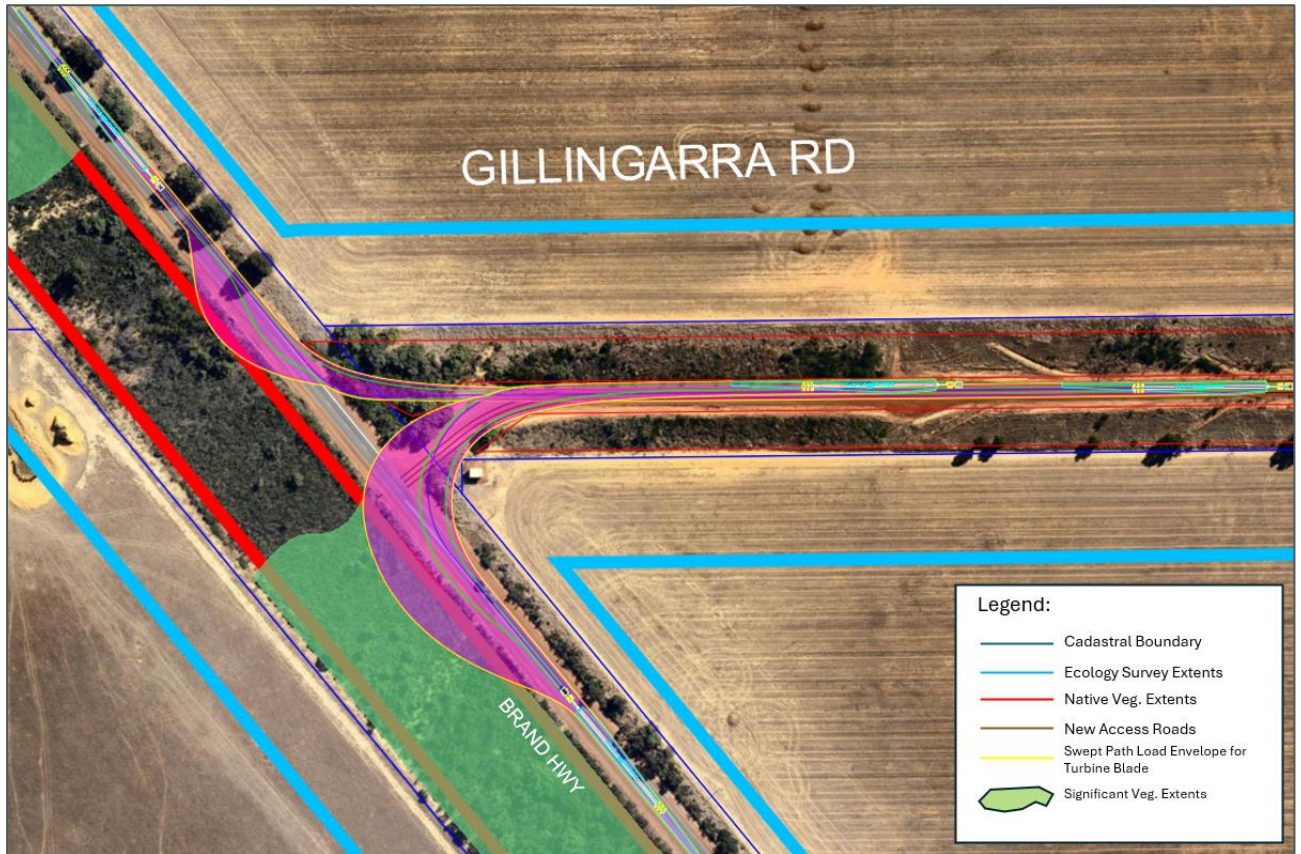


Figure 4-3 Gillingarra Road/ Brand Highway swept path analysis

### 4.1.3 Substation access

A substation is proposed to be located north of Gillingarra Road on the western side of the Brand Highway, as depicted in Figure 4-1. A proposed driveway connecting to the Brand Highway will provide access to the substation and satellite compound. Unlike the rest of the project site, this will not require facilitation of blade transportation, and so the most likely worst case vehicle for this location is associated with transformer transportation (see Figure 4-4 and Figure 4-5).

A typical vehicle for this is a prime mover with platform trailer which has been tested below for a 190 tonne transformer (as advised). For conservativeness, a single point of articulation has been adopted for the vehicle (rather than two) as to accommodate for variations in trailer configurations and available transport operator equipment (refer to Appendix B for further details).

It is noted that introducing an intersection here may have additional implications to clearing of 'significant' vegetation near the site (i.e. if turn lanes are required). Furthermore, the intersection may be required to be moved further north or south based on site-based inspection of site distances (noting there may be a vertical sight distance issue based on potential crest just north of intersection).



Figure 4-4 Substation access/ Brand Highway swept path analysis (Prime mover from south)

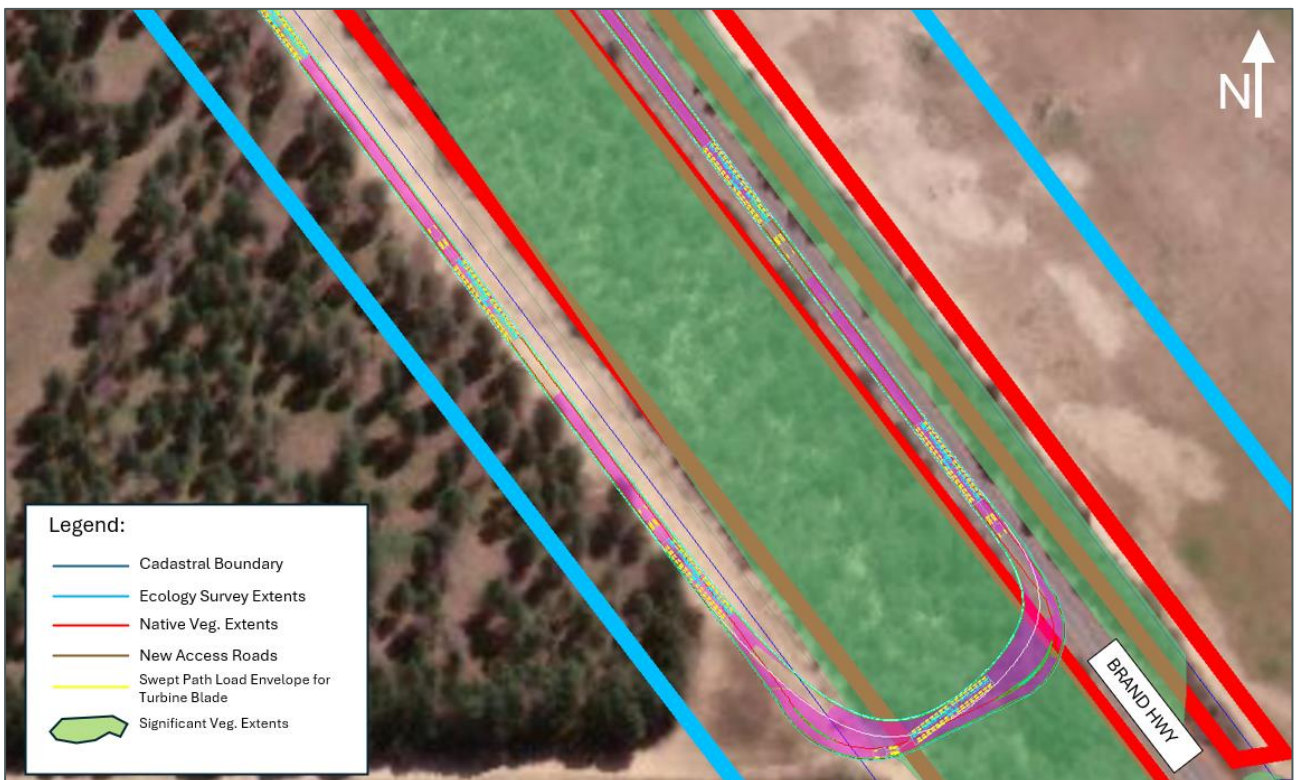


Figure 4-5 Substation access/ Brand Highway swept path analysis (Prime mover from north)

While transporting the transformer will only require a limited number of trips (to be managed with the assistance of traffic controllers), it is anticipated that smaller maintenance and operation vehicles will infrequently visit the site once it becomes operational. As such, a permanent intersection and driveway access will be required at this location.

The intersection treatment would be subject to Main Roads requirements, and further understanding of the expected number of trips. Operational trips to access this location would be subject to further review by the Proponent and Western Power as to better understand operational parameters, which would inform whether auxiliary or channelised turn lanes would be required (example included in Appendix C - Main Roads Standard Drawing 200131-0081-5). If a very low volume of traffic is confirmed to turn at this location, a treatment such as a rural driveway with capacity to a B-Double may be appropriate (refer to Main Roads Standard Drawing 200431-0195-3 in Appendix C).

A swept analysis for the manoeuvring of a 12.5m rigid truck has also been undertaken to demonstrate the operation at the proposed intersection as depicted in Figure 4-6 and Figure 4-7.



Figure 4-6 Substation access/ Brand Highway swept path analysis (Rigid truck from south)

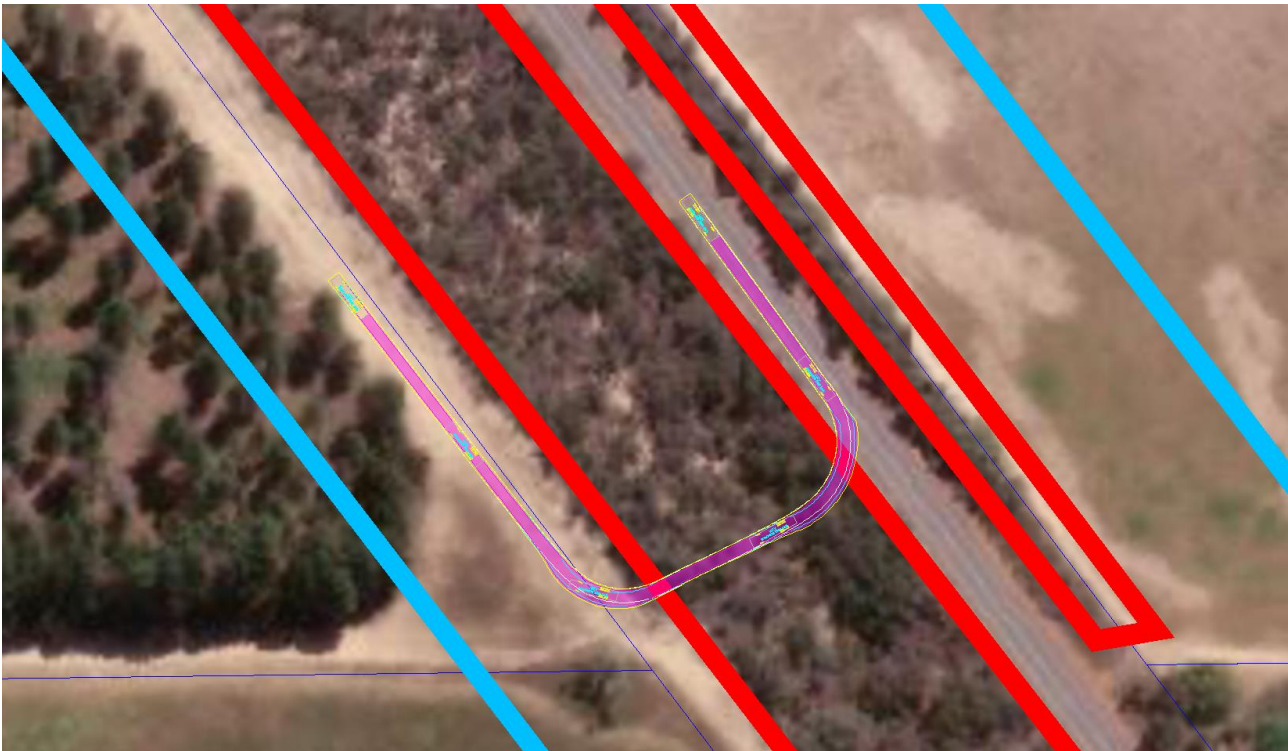


Figure 4-7 Substation access/ Brand Highway swept path analysis (Rigid truck from north)

#### 4.1.4 Turn around

A turn around facility was considered further north as to allow vehicles travelling northbound to instead pass the primary access, turnaround and enter the site from the northern approach of Gillingarra Road. This would minimise impacts to sections of 'significant' vegetation if Gillingarra Road was selected as the primary access. The location where access off the Brand Highway is shown in Figure 4-8 (note this access only, not where the turn around would occur).

This turn around facility could be located within the project site utilising the existing access driveway off Brand Highway. No conflict with 'significant' vegetation is identified at this location. Given the primary purpose of this turnaround is to cater for OSOM movements, this could be established as a temporary access (not to be retained for permanent use).

It is proposed that other heavy vehicles could also use this access during the construction phase, as to avoid the need for upgrading the existing bridge to the east. Once construction is completed, this access would be closed, and operational trips would utilise the internal network and existing bridge to access the area.

Given this is a temporary access, and vehicles are expected to be assisted by traffic controllers, it is expected to be of lower provisions than the required for a permanent access and intersections off the Brand Highway. Provision of an access here could be set out in accordance with Main Roads WA Standard Drawing 200431-0195-3 - Rural Driveway Setout B-double (see Appendix C), noting that additional hard stand is required to accommodate OSOM movements (subject to Main Roads approval).



Figure 4-8: Swept path analysis of Brand Highway access to turnaround

## 4.2 Internal roads

A preliminary review of the internal roads was also undertaken as to inform potential impacts with vegetation (classified as 'significant') and services. Preliminary swept path checks were undertaken for the intersections of each of the public internal roads (see Figure 4-9), in addition to those intersections with the private access roads (specific to turbine access) where there may be an impact to 'significant' vegetation.

The swept path analysis is included in the Route Assessment and Site Access Review in Appendix A which outlines the spatial impacts and resultant conflict for transportation of wind turbine blades. A number of opportunities were identified for consideration, also documented in Appendix A.

Unless stipulated otherwise by the Shire, these access points from local roads to the internal access roads should be set out in accordance with Main Roads Standard Drawing 200431-0195-3 - Rural Driveway Setout B-double (see Appendix C). Given these are private, it is expected that these would each be gated.

As part of the BYDA search, Dampier to Bunbury Gas Pipeline (DBNGP) was identified running north-south through the project site, it has been noted in the internal roads layout shows a proposed access road alignment over the existing DBNGP. It is understood that the process with Department of Planning, Lands and Heritage (DPLH) to receive consent to build infrastructure within the DBNGP easement as per the pipelines act is underway.

It is noted that Telstra utilities run along some of the road reserves including Dandaragan Road. Western Power returns were also received along with the BYDA returns indicating that Western Power has electrical power assets in the area including overhead power lines running parallel to Brand Highway. Both stakeholders have been engaged to discuss the Projects potential impact on their existing infrastructure and appropriate reduction or mitigation measures.

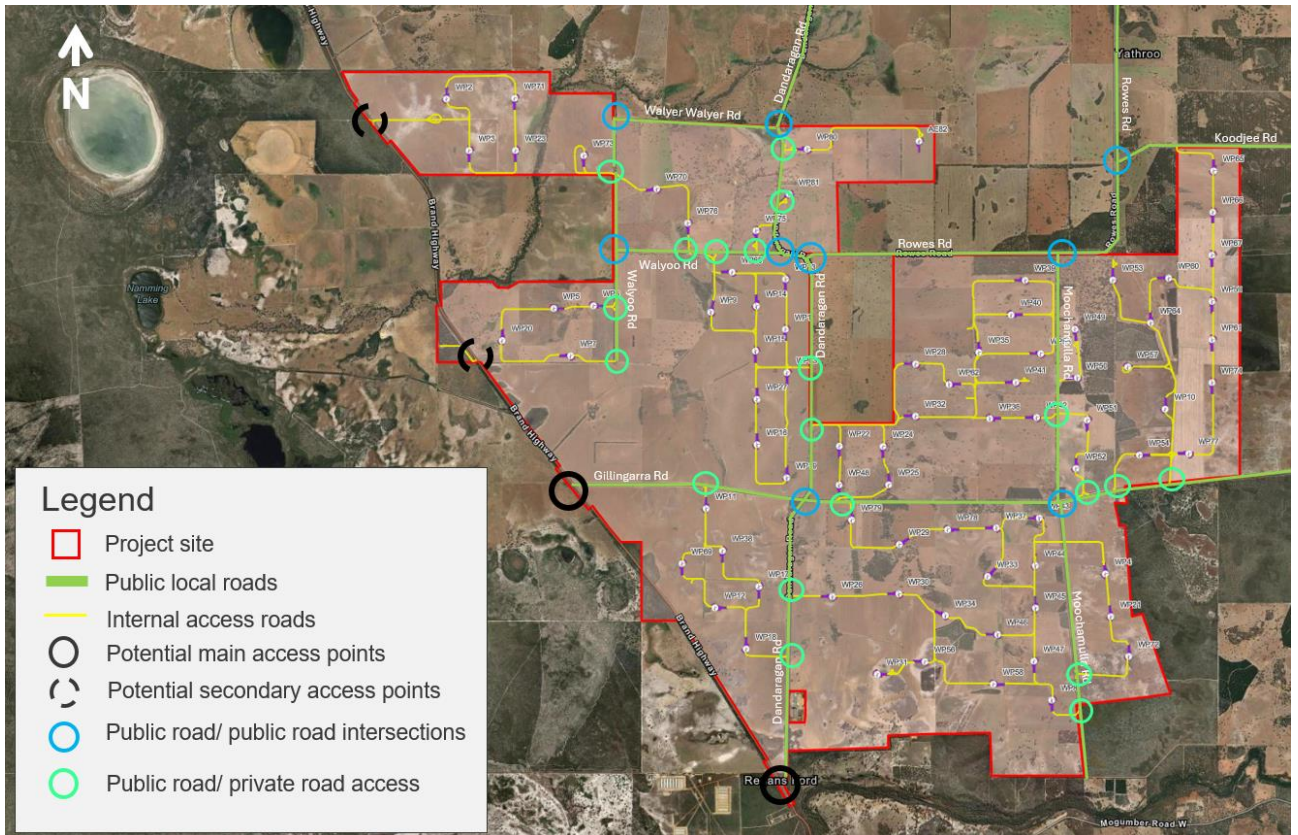


Figure 4-9 Internal swept path checks

# 5 Route assessment

## 5.1 Methodology

A preliminary route assessment (i.e. port to site) has been undertaken for the Project, and is included in Appendix A. The assessment reviews the transportation of wind turbine equipment from port to site with OSOM movements. Any required temporary or permanent modifications are also highlighted as part of this study to allow completion of works prior to the construction phase commencement.

The assessment was undertaken prior to this TIS, to maximise time allowed to make the required modifications to the network, given there are various approvals required (e.g. clearance of sensitive vegetation). The scope of the assessment does not include detailed analysis or design.

There are two ports considered as a point of entry for the wind turbine blades and component parts. They are as follows:

- Geraldton Port (approximately 250 km north of the project site)
- Australian Marine Complex (AMC) Port (approximately 150 km south of the project site)

Transportation of the wind turbine blades is used as the key test for determining the geometric constraints for each route. A preferred wind turbine OEM is yet to be determined thus the worst case (i.e. turbine with the largest component dimensions) was selected for the assessment. Additionally, overhead height is also closely considered for the transportation of the tower components.

A series of routes options from both ports of entry were evaluated to the project site for the components. Each route underwent the following assessment:

- Total kilometre distance required
- Heavy vehicle approved route classification, starting with highest possible order routes – HVS Mapping (Main Roads)
- Number of turns required
- Number of signalised intersections / roundabouts as part of the route
- Number of structures (overpasses, signs, etc) over the route and height clearance allowance for each structure
- Stop areas to allow for traffic to pass

In addition to the above, stakeholder engagement was undertaken to understand the local conditions at each port in addition to the broader transport network constraints.

- Geraldton Port – Mid West Ports Authority
- Australian Maritime Complex (AMC) Port – Ventia
- Main Roads HVS
- Rex J Andrews Pty Ltd (RJA)
- Main Roads Gascoyne Region

As a result of this exercise a set of preferred routes were selected.

## 5.2 AMC Preferred Route 1

From the stakeholder conversations with the AMC Port, it was discussed that the port has previously received wind turbine components for transportation to site. Various options are available within the port for laydown and storage. The preferred route for AMC Port for the turbine blades is summarised in Table 5-1 and presented in Figure 5-1.

The basis of this selection is as per Main Roads recommendations to avoid the Thomas Road/ Tonkin Highway intersection (and instead use Kwinana Freeway) as upgrades are planned as part of the Tonkin Highway extension south. Such works could impose spatial restrictions that would limit the ability for transportation of blades.

Furthermore, it is understood (based on stakeholder discussions) that the three roundabouts on Thomas Road introduce challenges for blade transportation. Moreover, using Kulija Road to access Kwinana Freeway provides more space to navigate turn (in comparison with Thomas Road interchange – as confirmed in stakeholder discussions).

This route can accommodate a maximum loaded height of 5.6m, where the lowest unavoidable structure is Stanton Road overpass (5.6m). This route will be suitable for the transportation of the blades, which typically do not exceed 5m in height once loaded on the vehicle (including transport frame).

Furthermore, Muchea Road Train Assembly Area (RTAA) is a logical stop-over for AMC Port to site, given it is approximately halfway along the route, and is located on the border of the Perth Metropolitan area (i.e. border of change in operational requirements).

Table 5-1 Overview of AMC Port Preferred Route 1

Longlist route No.	Port	Route Summary	Route Distance	Number of turns	Maximum height
Option 4	AMC Port	Cockburn Road, Rockingham Road, Mandurah Road, Kwinana Freeway, Roe Highway and Tonkin Highway, Brand Highway	203km	8	5.6m

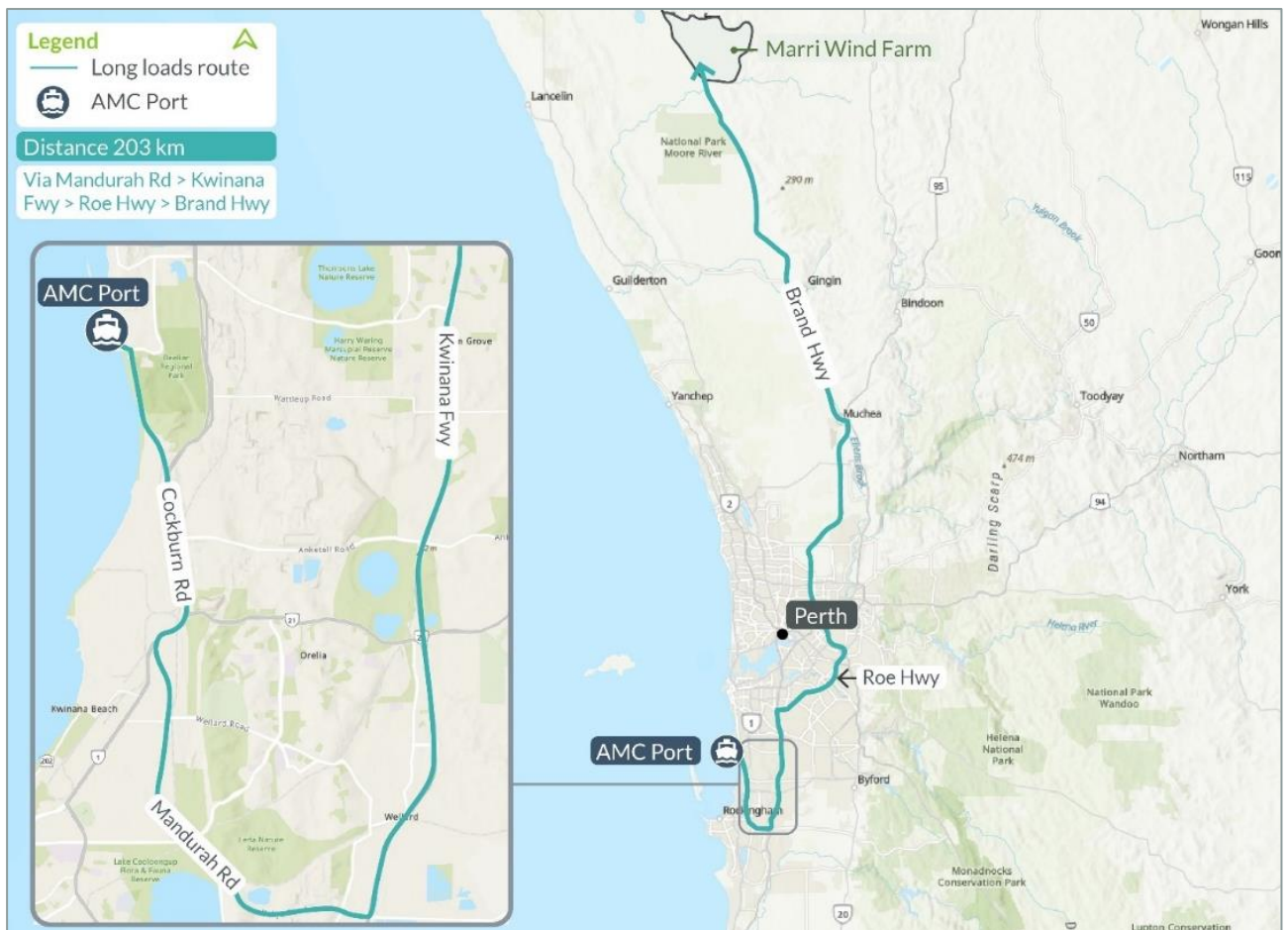


Figure 5-1 AMC Preferred Port Preferred Route 1 (Source: Aurecon GIS)

## 5.3 AMC Preferred Route 2

An alternate route was investigated with the intent of understanding whether an increased overhead loaded height can be achieved. The alternate route for AMC Port is summarised in Table 5-2 and shown in Figure 5-2. This route utilises Thomas Road and Tonkin Highway (rather than Kwinana and Roe Freeways in the Preferred Route 1) as the additional requirements for space to accommodate blade lengths would not be required and as it is also a simpler route. Furthermore, this route has no overhead structures up to the Roe Highway/ Tonkin Highway interchange whereas Preferred Route 1 would have been limited to 6.18m to get to this point (even if using on/off ramp deviations at all possible points).

Alternate 'sub-routes' were also investigated for transportation of components requiring overhead clearance exceeding 5.6m (i.e. tower sections). It should be noted that the vertical clearance requirement is 6.8m to accommodate tower sections. To avoid limitations of overhead structures on Tonkin Highway, sub-routes would have to deviate off the Tonkin Highway adjacent to the area near Perth Airport.

Two preliminary options have been identified, which are detailed in Figure 5-2. Both routes require contraflow movements and ultimately connect onto the Roe Highway. Connection onto Roe Highway is shown following structures which would have limited overhead height, including the Roe Highway/ Maida Vale Road overpass (5.48m) and Roe Highway/ Bushmead Road overpass (5.6m).

Note the above alternate sub-routes would be subject to the selected vehicle configurations from the specific transport operator. HVS requires these vehicles to be below the high-risk OSOM dimensions of 50m length, as to facilitate movements.

Furthermore, deviation around the interchange at Brand Highway/ Great Northern Highway is required for loads exceeding 6.2m, if coming up Great Northern Highway (as per alternative sub-routes). This is also shown below, with a potential alternative to minimise contraflow travel, as documented under stakeholder engagement (see Section 6.2.4 – RJA).

**Table 5-2 Overview of AMC Port Preferred Route 2**

Longlist Route No.	Port	Route Summary	Route Distance	Number of turns	Overhead clearance
Longlist Option 3	AMC Port	Cockburn Road, Rockingham Road, Thomas Road and Tonkin Highway, Brand Highway	195km	6	5.6m
<b>Alternate sub-routes at area adjacent to Perth Airport:</b>					
Sub-route No. 1 (unrestricted/will allow 6.8m height)					
Sub-route No. 2 (maximum height of 6.4m – Tonkin Hwy/ Abernethy Rd off-ramp footbridge)					

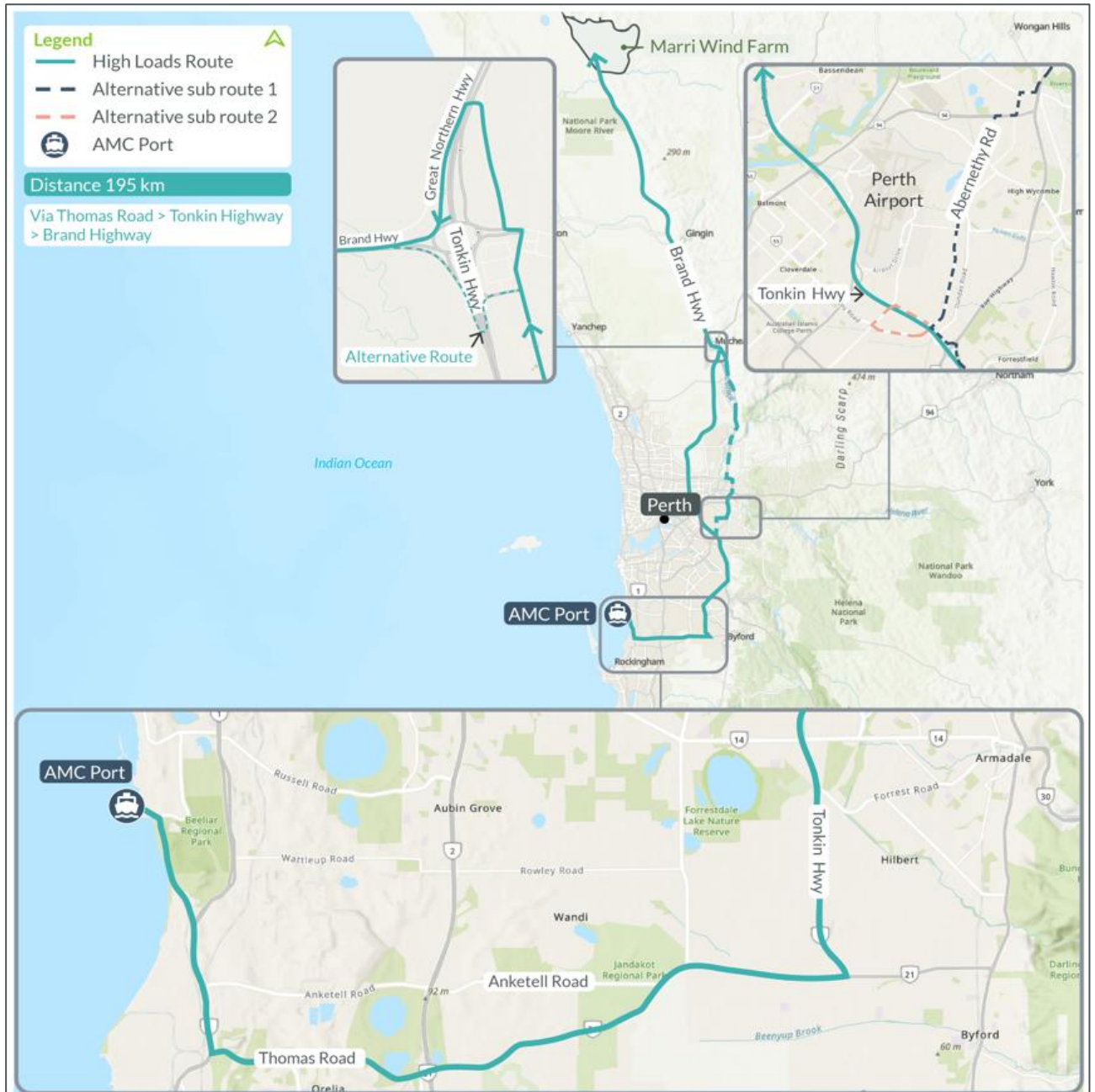


Figure 5-2 AMC Preferred Route 2 (Source: Aurecon GIS)

## 5.4 Geraldton Port preferred route

During consultation with the Port of Geraldton, it was discussed that Reg Clarke Road would be utilised as the port road to connect from Berth 6 and the laydown area to the external road network. As per stakeholder discussions, an assessment has previously been undertaken that shows a 91m blade can be transported for this internal route with minor modifications (expected to be implemented early 2026), thus for the purposes of this study, is assumed to be made possible at the time needed for the Project (late 2026).

The preferred route for Geraldton Port is summarised in Table 5-3 and presented in Figure 5-3. This avoids the tight turn from John Willcock Link onto Brand Highway (Longlist Route No. 2) and the adjacent urban area (including overhead powerlines). This route also traverses area adjacent to Goulds Road, which provides options of storage. Furthermore, it is significantly shorter than Longlist Route No. 1 (Geraldton Mount Magnet Road and Great Northern Highway), which utilised the highest order OSOM route possible (totalling 939km).

The preferred route can accommodate a maximum loaded height of 6.8m. Note this requires use of the formed bypass at Highbury Street and Abraham Street bridges, which consists of a slight deviation off road to travel under higher section of span.

**Table 5-3 Overview of Geraldton Port Preferred Route**

Longlist Route No.	Port	Route Path	Route Distance	Number of turns	Maximum height
Option 3	Geraldton	Ian Bogle Road, John Willcock Link, Geraldton Mount Magnet Road, Goulds Road, Rudds Gully Road, Brand Highway	287 km	6	6.8m
<p>Starting at Ian Bogle Road &gt; continuing west and turning south (450 m) &gt; continues south onto John Willcock Link continuing south and east (4.8 km) &gt; RT Geraldton Mount Magnet Road continuing east (5.3 km) &gt; RT onto Goulds Road continuing south (3.5 km) &gt; RT onto Rudds Gully Road continuing east (3.6 km) &gt; LT on Brand Highway continuing south and east (62.1) &gt; RT onto Brand Highway (at Yardarino T-intersection) continuing south (205.5 km) &gt; LT into site.</p>					

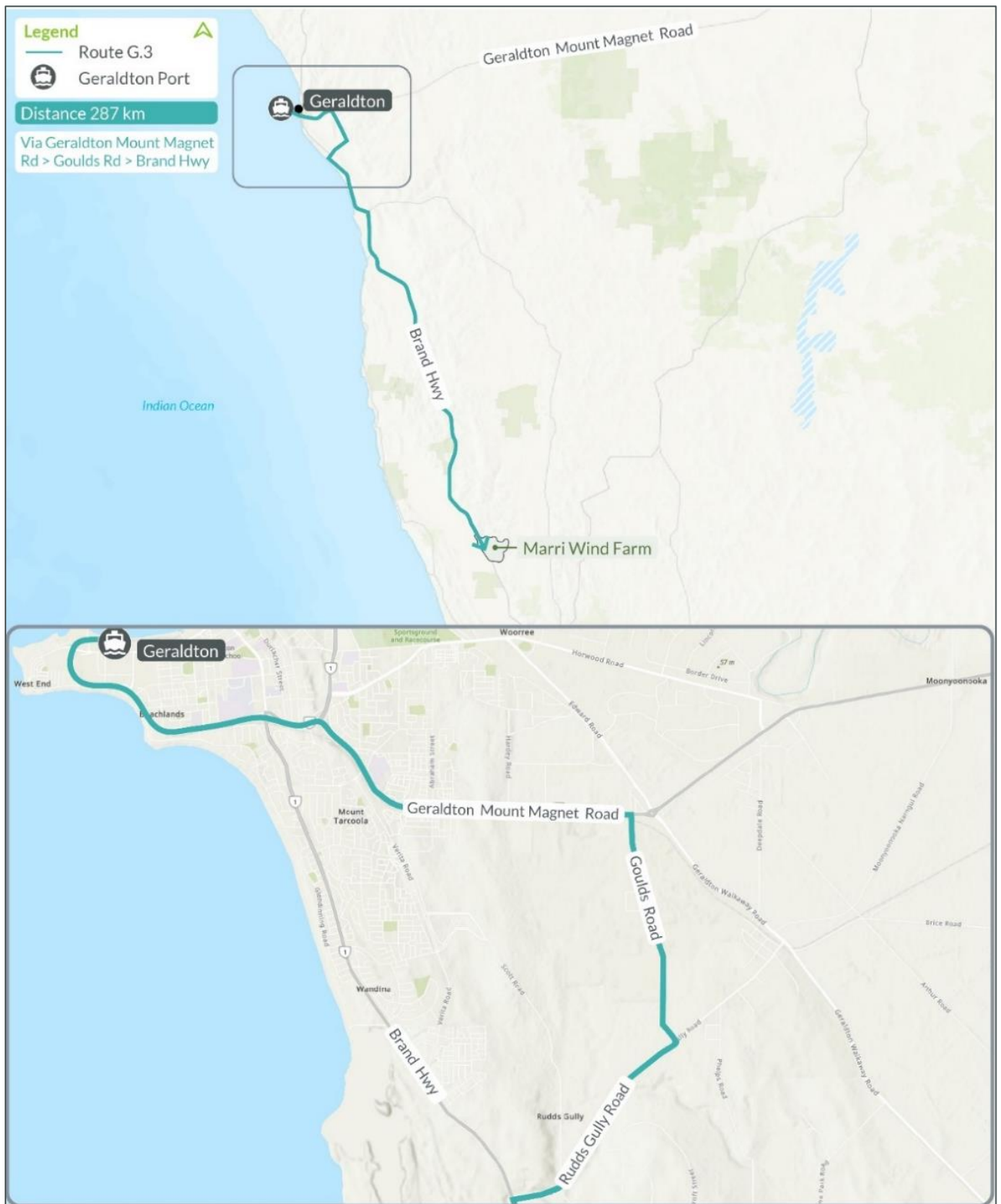


Figure 5-3 Geraldton Port Preferred route (Source: Aurecon GIS)

## 5.5 Route assessment summary

A summary of the evaluation of the routes is provided in Table 5-4. For AMC Port to site, there are considerable overhead constraints, two potential routes have been identified dependant on the component being transported.

Note trailer configuration is subject to transport operator specifications to determine total overhead height for transportation of tower components, which would impact use of Preferred Route 2, and Alternative Sub-route 1 and Sub Route 2.

Detailed OSOM vehicle audits will be undertaken by the haulage companies that are transporting key infrastructure to the project site. This will be followed by formal route planning which will include all relevant stakeholder engagement to manage risk associated with the movement of these vehicles.

Table 5-4 Route Option Evaluation Summary

Primary Routes	Route Evaluation Considerations
<b>AMC Port</b>	
Preferred Route 1 (blades) – 203km	<ul style="list-style-type: none"> <li>■ Mandurah Road, Kwinana Freeway, Roe Highway and Tonkin Highway</li> <li>■ Overhead clearance of 5.6m</li> <li>■ 5 locations require modifications to facilitate movement of the 91m blade for transportation. Two locations require contraflow (i.e. travel on opposite side of road).</li> <li>■ AMC Port requires reversing out of southern gate due to significant constraints in area, including an adjacent building and tight turn at Cockburn Road.</li> </ul>
Preferred Route 2 (high loads) – 195km	<ul style="list-style-type: none"> <li>■ Main route up along Thomas Road/Tonkin Highway/Brand Highway               <ul style="list-style-type: none"> <li>– Overhead clearance of 5.6m</li> <li>– Likely suitable for most components excluding blades and tower sections</li> </ul> </li> <li>■ Alternative routes to accommodate tower sections               <ul style="list-style-type: none"> <li>– Sub-route 1 onto Abernethy Road/ Roe Highway/ Great northern Highway                   <ul style="list-style-type: none"> <li>■ This is the Main Roads high haulage route and is extensively used</li> <li>■ No overhead clearance limitation (i.e. allows 6.8m clearance)</li> <li>■ Considerable length of contraflow requiring traffic management</li> </ul> </li> <li>– Sub-route 2 onto Abernethy Road/ Roe Highway/ Great northern Highway                   <ul style="list-style-type: none"> <li>■ Overhead clearance of 6.4m</li> <li>■ Has less significant length of contraflow and so may be an alternative for some components (i.e. loads &gt;5.6m and &lt;6.4m)</li> </ul> </li> </ul> </li> <li>– Sub-route 1 and 2 at Tonkin Highway/Brand Highway interchange               <ul style="list-style-type: none"> <li>■ Requires contraflow to avoid overhead structure.</li> </ul> </li> </ul>
<b>Geraldton Port</b>	
Preferred Route (all components including blades and high loads) – 287km	<ul style="list-style-type: none"> <li>■ John Willcock Link/ Geraldton Mount Magnet Road, Goulds Road and Brand Highway</li> <li>■ Overhead clearance of 6.8m</li> <li>■ Slight deviation off road to travel under higher section of bridge span to achieve above clearance               <ul style="list-style-type: none"> <li>– Highbury Street</li> <li>– Abraham Street</li> </ul> </li> <li>■ Five locations require modifications to facilitate movement of 91m blade transportation (assuming modifications at Geraldton Port/ Reg Clarke Road complete). All five locations require cutting through intersection on the opposite side of the road.</li> </ul>

## 6 Conclusions

Marri WF Pty Ltd as trustee for the Marri WF Unit Trust (the Proponent) is proposing to develop the Marri Wind Farm project within the Shire of Dandaragan. Aurecon was engaged to prepare a transport assessment in support of the Development Application (DA), in accordance with the WAPC Transport Assessment Guidelines (Volume 4 – Individual Developments).

The Project will comprise up to 82 wind turbines with a total generation capacity of approximately 550 megawatts and an anticipated operating life of 35+ years. The project site is located east of the Brand Highway, approximately 140 kilometres north of Perth, and will generally be accessed via Dandaragan Road and Gillingarra Road.

This assessment has been undertaken to identify any key traffic and transport risks that may be relevant to the ongoing design or implementation of the Project. The assessment has found that:

- The Brand Highway provides the highest order road connection to the project site (Primary Distributor road and freight classification Tandem Drive Network N7 and Tri Drive Network TD4) traversing in a north south direction immediately to the west of the project site.

The main access from Brand Highway is from either Dandaragan Road or Gillingarra Road (subject to further investigations), both of which are Shire roads. Selection of the main access is subject to ongoing various aspects and is yet to be determined.

- The following Shire roads will be utilised to provide direct access to the Project's internal road network (i.e. provides direct access to the WTGs and ancillary buildings):
  - Dandaragan Road (accessed via Brand Highway)
  - Gillingarra Road (accessed via Brand Highway)
  - Moochamulla Road (accessed via Gillingarra Road)
  - Walyoo Road (accessed via Dandaragan Road)
  - Walyer Walyer Road (accessed via Dandaragan Road)
  - Koodjee Road (accessed via Rowes Road)
  - Rowes Road (no direct access but part of connecting network)
- Sections of the above Shire roads are currently unsealed and/or narrow. Suitable road improvements and upgrades will be investigated and implemented to support the traffic volumes and heavy vehicles expected. A road condition report would also be required if utilising roads without implementing upgrades (potentially the case for Dandaragan Road and Rowes Road).
- The existing Shire roads currently cater for a reasonably low level of traffic, although may experience seasonal peaks associated with agricultural traffic movements.
- The proposed construction activities identified by this study are expected to add a reasonably small traffic demand. A daily total of 80 light, 197 heavy, and 8 OSOM vehicle trips (return trips i.e. in and out) are estimated during the peak of the construction period, which will access various locations dispersed across the project site (i.e. not all using the same internal access point). For the peak hour, this is estimated at 40 light vehicles, 19 heavy vehicles and 1 OSOM vehicle trips.
- The operations and maintenance phase traffic is expected to introduce considerably less impact than the construction phase due to lower traffic movements generated and the lesser need for heavy vehicles. Note there is potential for cumulative traffic impacts with Yathroo Wind Farm (both construction and operational) on Brand Highway and sections of Dandaragan Road.
- The traffic impact of the decommissioning phase is also expected to be less than that of construction due to lower traffic volumes. The decommissioning phase of the Project will be subject to a separate future assessment.
- The largest typical transport vehicle selected for review of horizontal spatial requirements and resultant impacts at the project site and route is the heavy vehicle combination that transports the turbine blades.

The specific OEM supplier is yet to be confirmed, however the worst case (i.e. the largest shortlisted wind turbine) has been selected for assessment purposes. This consists of a 91m blade length and truck combination length of 103.1m. Transportation of tower components represents the largest vertical clearance requirements (6.8m), however require less space from a horizontal perspective. Note swept path analyses of general heavy vehicles (for construction and operational phases) will be required at subsequent stages of Project as to help inform intersection upgrade requirements (i.e. used as a check during design of intersections).

- The site access review has established the spatial requirements and resultant impacts for the two potential main accesses to the project site for the blade transportation (worst case), at Brand Highway/Dandaragan Road and Brand Highway/Gillingarra Road.

Clearing of vegetation classified as 'significant' (i.e. previously mapped or newly recorded instances of Threatened Ecological Communities/TEC) would be required for either access, with a larger magnitude for Dandaragan Road. Note temporary hardstands would also be required to facilitate movements. If Gillingarra was to be selected as the primary access, this would likely trigger upgrade of the intersection, which may result in further widening of Brand Highway to accommodate splitter islands and turn lanes, which could result in further vegetation clearing requirements (subject to further consultation).

As noted by Main Roads Gascoyne Region, upgrades along Brand Highway will require a full Main Roads set of drawings.

- The site access review also established the spatial requirements and resultant impacts for the two potential secondary accesses to the project site, which include access to the substation on the west side off Brand Highway and the turnaround facility to the north (also off Brand Highway) so vehicles accessing Gillingarra Road from the south (if this access is adopted) can turnaround and approach the Gillingarra Road intersection from the northern approach.

At the substation access, clearing of vegetation classified as 'significant' and temporary hardstand would be required to accommodate the transformer transportation (worst case) during construction. To determine the spatial impacts, a 190 tonne transformer OSOM combination has been adopted. The intersection with Brand Highway would also require a permanent solution as to provide access for operational staff. It is anticipated that this intersection be upgraded to meet the requirements set by Main Roads.

The proposed turnaround facility would minimise impacts to 'significant' vegetation if Gillingarra Road was selected as the primary access. No conflict with 'significant' vegetation is identified at the proposed location. Given the primary purpose of this turnaround is to cater for OSOM movements, this could be established as a temporary access and so it is expected to be of lower provisions than that required for permanent access. Provision of an access here could be set out in accordance with Main Roads WA Standard Drawing 200431-0195-3 - Rural Driveway Setout B-double (see Appendix C), noting that additional hard stand is required to accommodate OSOM movements (subject to Main Roads approval).

- Key intersections in the internal road layout have also been reviewed, particularly at intersections of Shire roads and internal access roads, in addition to locations with potential vegetation clearing requirements. Various locations require vegetation clearing and hardstands, with further refinement likely to occur. Detailed swept path analyses to determine cost of temporary works (e.g. quantities for hardstands) would be required at subsequent stages of the Project.
- Port to site routes for both Geraldton Port and AMC Port have been identified with key locations that may require modification to facilitate movements (e.g. clearance of vegetation, modifications to roads and roadside items). The required updates are subject to the selection of the preferred port of entry (yet to be determined). This considered the 91m blade length and truck combination length of 103.1m. Overhead heights restrictions were also considered, with the transportation of the tower components requiring an alternative route to blade transportation for AMC Port to site (up to 6.8m overhead clearance required).
- Following this preliminary assessment of the preferred routes, Main Roads (relevant regions and its Road and Traffic Engineering branch (RTE)) will need to provide approval of any required design considerations. The City of Greater Geraldton will also be required to be consulted for any required changes on Goulds Road and Rudds Gully Road. Furthermore, any other impacted asset owners (e.g.

utilities) will need to be consulted with. Where OSOM deliveries would intrude within clearance requirements, these will also require consultation with the appropriate power authorities

- An OSOM Traffic Management Plan (TMP) must be prepared and approved by HVS prior to the transportation of any OSOM, such as the blades. This would be done in consultation with Main Roads and affected Local Governments. To minimise the impacts of the blade delivery, the TMP would set out strategies and processes to maintain the safety and performance of the local road networks (establish traffic wardens and processes etc – not part of current study).

The TMP would include commentary on escort vehicles and temporary restrictions required to manage conflicts.

The TMP will not be finalised until the detailed OSOM route survey is completed. Detailed OSOM route survey will be undertaken by the haulage companies that are transporting key infrastructure to the site. This will be followed by formal route planning which will include all relevant stakeholder engagement to manage risk associated with the movement of these vehicles.

- A Mass Only Assessment a (MOA) based on the heaviest OSOM combination (transformer) should be requested from HVS to determine any weight restrictive elements on the network. Whilst this can be done at any point in the project planning, it is recommended this be done at the earlier stages (unless there is a chance that transformer size could increase).

# Appendix A – Route Assessment

# Memorandum

To	<b>Leon Chew</b>	From	<b>Ben Green</b>
Copy	<b>Amanda Weston</b>	Reference	<b>525974</b>
Date	<b>2025-09-26</b>	Pages (including this page)	<b>42</b>
Subject	<b>Marri Wind Farm – Route Assessment and Site Access Review (Final_Rev2)</b>		

## 1 Project background

Marri WF Pty Ltd as trustee for the Marri WF Unit Trust (the Proponent), a wholly owned subsidiary of Alinta Energy Pty Limited (Alinta Energy), is seeking approval to develop Marri Wind Farm (the Proposal) located approximately 20 kilometres (km) south of the township of Dandaragan within the Shire of Dandaragan. This Proposal will have up to 82 wind turbines, each up to 275 m maximum height and capacity to generate up to 550 megawatts (MW) renewable energy. Aurecon have been engaged by Alinta Energy (‘the Client’) to conduct a transport study for the transportation of heavy equipment from ports of entry, to the Marri Wind Farm proposal site.

The objective of this study is to assess and analyse different route options for the transportation of specialised heavy equipment from port to site for the Project. This study constitutes a high-level review, identifying potential constraints and their potential impact. A high-level review of the windfarm site and access to the site is also included in the study. The scope of this assessment does not include detailed analysis or design.

The priority of the assessment is to identify and document areas along the potential routes from Port to site that may require any clearance of vegetation and upgrades to roads, to facilitate movements. This is intended to optimise the transportation process to enhance efficiency, cost-effectiveness, and minimises any potential delays and logistical challenges.

For the purposes of this study, Aurecon has reviewed the required design standards to be used, developed and compared alternative routes from various ports to the site, reviewed swept path movements and conducted stakeholder sessions. The information obtained from these investigations has been used to develop potential preferred routes from each port.

## 2 Abbreviations

**Table 1 Summary of Abbreviations**

Abbreviation	Definition
AMC	Australian Marine Complex
BOD	Basis of Design
BYDA	Before You Dig Australia
DBNGP	Dampier to Bunbury Gas Pipeline
GNH	Great Northern Highway
HVS	Heavy Vehicle Services
LT	Left turn
MOA	Mass Only Assessment

Abbreviation	Definition
MRWA	Main Roads Western Australia
OEM	Original Equipment Manufacturer
OSOM	Over Sized Over Mass
RAV	Restricted Access Vehicle
RJA	Rex J Andrew Pty Ltd (transport operator)
RT	Right turn
RTAA	Road Train Assembly Area
TIA	Transport Impact Assessment
TMP	Transport Management Plan

### 3 Reference information

The reference information used for the study includes:

- ArcGIS Pro and Nearmap aerial imagery used for the site drawings
- Oversize Overmass (OSOM) routes and RAV network applicable details
- Main Roads Western Australia OSOM guidelines – Guide to Design of OSOM Vehicle Corridors<sup>1</sup> and Traffic Guidance Schemes<sup>2</sup>
- Lessons learned and information from existing and previous projects
- Vehicle specifications
- Latest technology and industry best practice (internal)
- Stakeholder details
- Stakeholder feedback and supplied information

### 4 Project area

The proposed Marri Wind Farm site is located within the Shire of Dandaragan approximately 120 km north of Perth CBD and 40 km west of the town of Lancelin. The nearest major road is the Brand Highway that runs along the western side of the site in a north to south direction. The location of the project area is shown in Figure 4-1.

There are two ports considered as a point of entry for the wind turbine blades and component parts. They are as follows:

- Geraldton Port (approx. 250 km north of the site)
- Australian Marine Complex (AMC) Port (approx. 150 km south of the site)

<sup>1</sup> [Guide to Design of Oversize and Over-Mass Vehicle Corridors | Main Roads Western Australia](#)

<sup>2</sup> <https://www.mainroads.wa.gov.au/heavy-vehicles/permit-order-scheme/osom/>

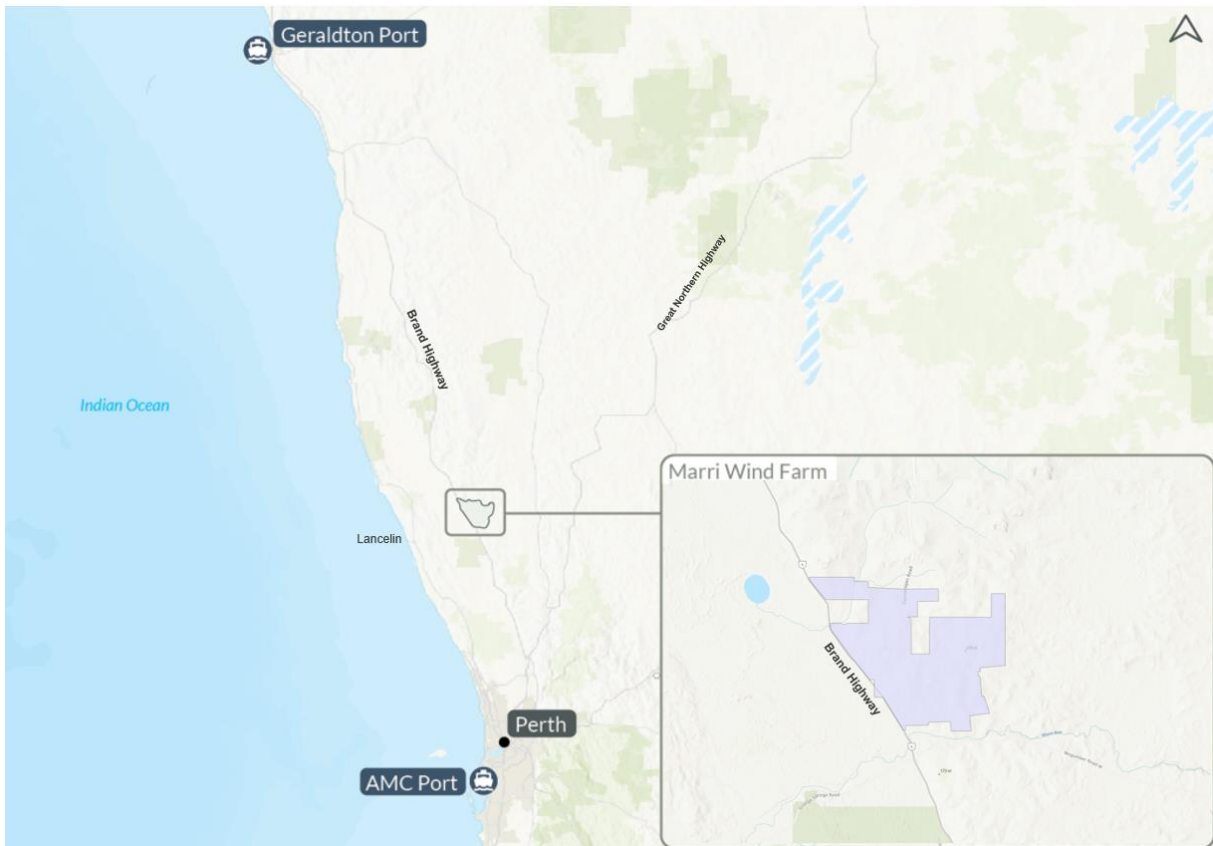


Figure 4-1 Marri Wind Farm site Location (SOURCE: ARCGIS Pro 2023)

## 5 Basis of design

The Basis of Design (BoD) detailed in Table 2 below sets out the parameters used for the investigation of the preferred transportation of the heavy equipment. Note all details below are subject to change based on the final selected OEM and their particular specifications. The below details are generally selected as the worst case as to provide an overarching guide for the purposes of this study.

Table 2 Basis of Design Summary (dependant on OEM selected)

Design element	Specification
Number of Turbines	82
Turbine type	Goldwind (GWH182-8.0)
Swept path analysis: Design Vehicle	Vestas Blade Pinned Trailer – Adjusted to suit 91m long and 5m wide blade (worst case) from above (Goldwind specs).
Minimum horizontal curvature (to stay lane corrected)	120m (inner radii)
Vertical clearance	6.8m
Longitudinal grades	9% (Goldwind)

Design element	Specification
Vertical curvature	Grades <15% for site area Grade <18% for transport route Approximate minimum K value = 9
Minimum required road width	5.5m
Passing requirements	Every 20km
Average traveling speed on gravel roads	7 – 20 km/h (assumed 15km/h)
Average travel speed on surfaced road	50km/h (note can travel up to 80km/hr in some instances – as advised by HVS)
Turning speed (Sharp turns)	5km/h
Turning time (Sharp turns)	15min
Max weight	See below

The general component mass for each of the wind turbine components is shown in Table 3, specific to the Goldwind specifications. Note, the turbine components may vary depending on the final decision regarding configuration etc (e.g. hub height) and so are a reference only.

**Table 3 Wind turbine components mass (Goldwind specifications)**

Wind turbine component	Estimated component mass (tonnes) for transportation*	Number of trips
Towers and accessories (bottom to top)	93 (T1), 91 (T2), 92 (T3), 64 (T4), 52 (T5), 11 (Accessories)**	492-656***(depending on final tower configuration)
Blade	32	246
Nacelle	43	82
Hub	54	82
Drivetrain and generator	106	82

\*Includes transport frame but does not include vehicle mass

\*\*General details provided by supplier only and not specific to exact tower height/configuration

\*\*\*Could be up to 8 tower sections for 150m hub height (based on knowledge from previous projects – to be confirmed)

## 6 Route assessment

### 6.1 Long list evaluation

A series of routes options from both ports of entry were evaluated to the site for the components. Each route underwent the following assessment:

- Total kilometre distance required
- Heavy vehicle approved route classification, starting with highest possible order routes – HVS Mapping (Main Roads WA) – see Figure 6-1
- Number of turns required
- Number of signalised intersections / roundabouts as part of the route

- Number of structures (overpasses, signs, etc) over the route and height clearance allowance for each structure
- Stop areas to allow for traffic to pass

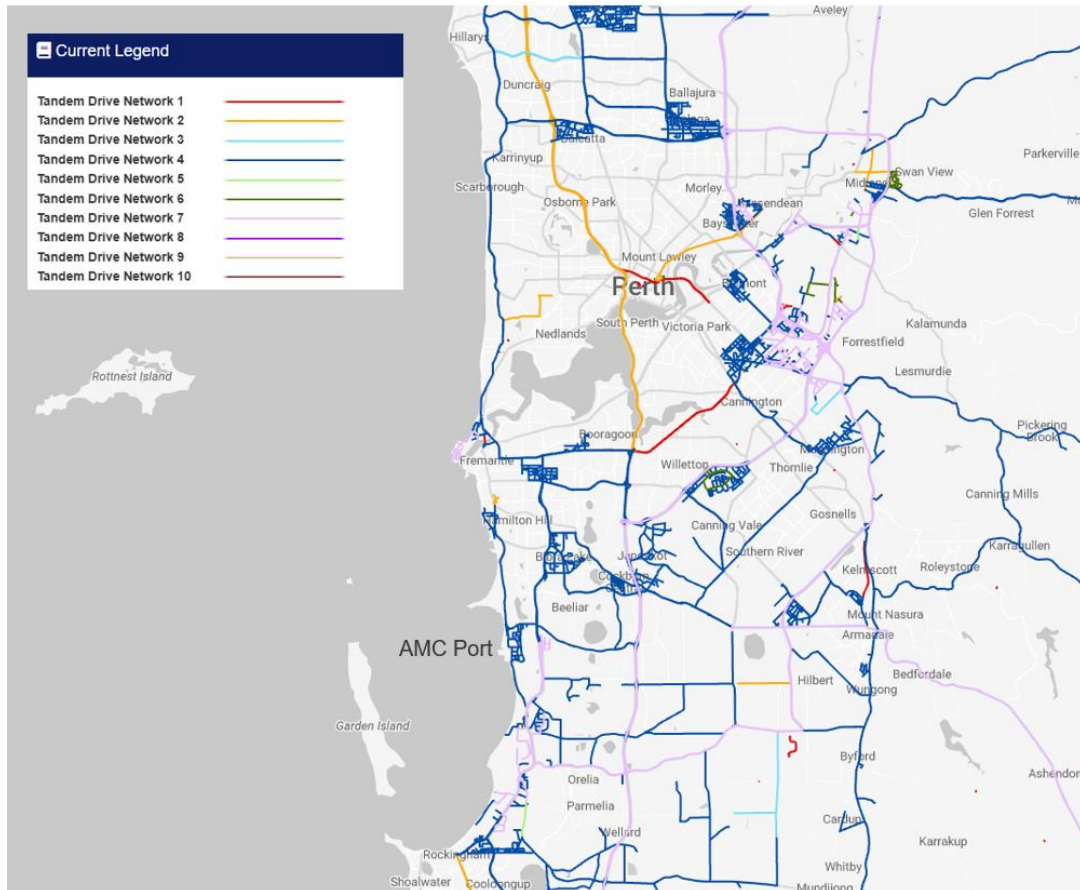


Figure 6-1: HVS Maps routes in Perth Metropolitan

The longlist of options is summarised in Table 4 for AMC Port to site and illustrated in Figure 6-2.

Table 4: Longlist of routes for AMC Port to site

No.	Route	Distance	Details
1	LT onto Cockburn Road > RT onto Russell Road > RT onto Rockingham Road > LT onto Russell Road > LT onto Hammond Road > RT at roundabout onto Armadale Road > LT onto Tonkin Highway > LT slip lane onto Brand Highway > RT into site.	187km  Varies across networks such as 27.5m Oversize B-Double, 27.5m Oversize Road Train, 36.5m Oversize Road Train	10x turns  23x signalised intersections  11x roundabouts  15x structures above  25x on structure

No.	Route	Distance	Details
2	RT onto Cockburn Road > RT onto Rockingham Road > RT onto Anketell Road > LT onto Thomas Road > LT onto Tonkin Highway > LT slip lane onto Brand Highway > RT into site.	195km  Varies across 27.5m Oversize Road Train, 36.5m Oversize Road Train	6x turns  18x signalised intersections 3x roundabouts 15x structures above 24x on structure
3	RT onto Cockburn Road > RT onto Rockingham Road > LT onto Thomas Road > LT onto Tonkin Hwy > Continuing along Tonkin Hwy (80 km)> LT onto Brand Hwy > RT into site.	195km  Follows highest OSOM network possible – 36.5m Oversize Road Train	6x turns  19x signalised intersections 4x roundabouts 18x structures above 32x on structure
4	RT onto Cockburn Road continuing south > LT onto Mandurah Road continuing southeast, joins onto Kulija Road and Mundijong Road > LT onto Kwinana Freeway continuing north > RT bend onto Roe Highway at interchange continuing east > LT onto Brand Highway > RT into site.	203km  Varies across 27.5m Oversize B-Double, 27.5m Oversize Road Train, 36.5m Oversize Road Train	8x turns  7x signalised intersections 3x roundabouts 33x structures above 31x on structure

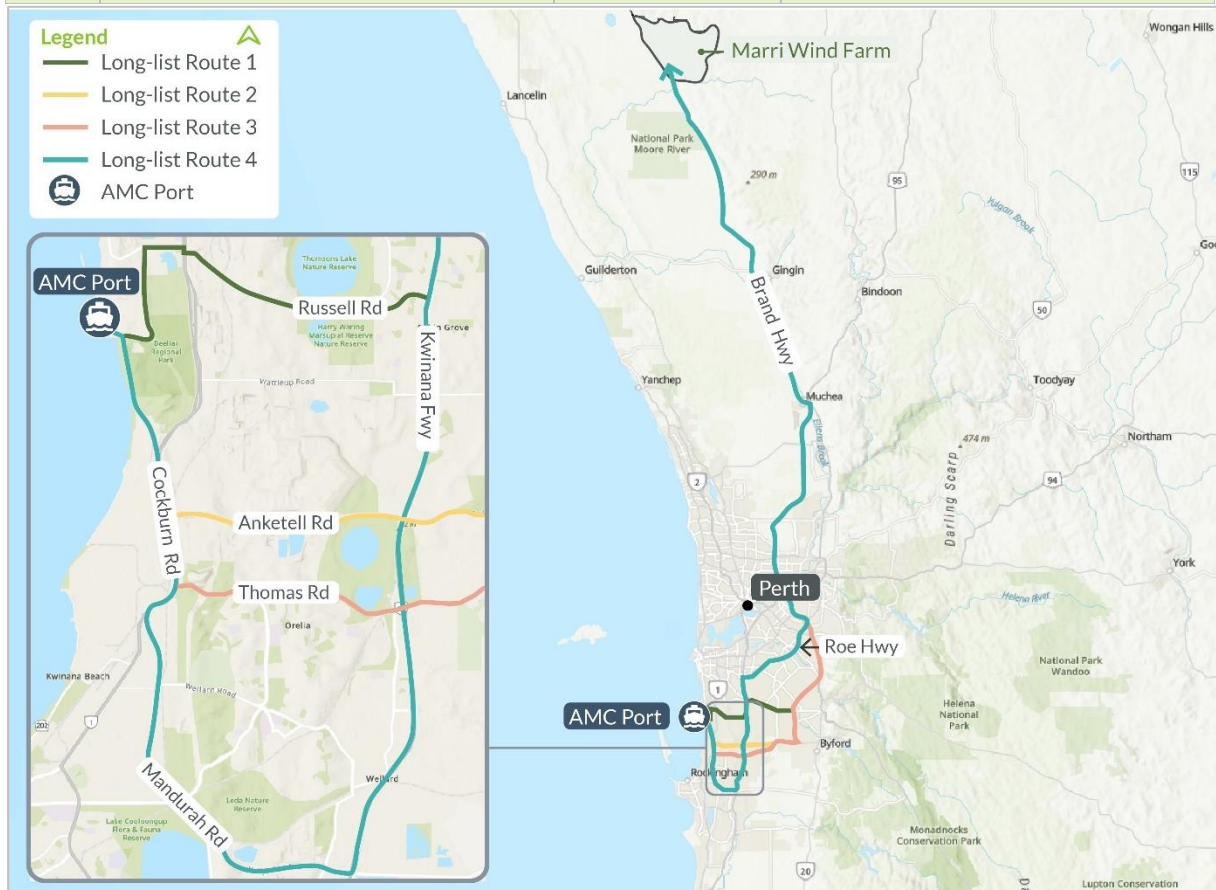


Figure 6-2 Longlist of Routes AMC Port to Site

The longlist of options for Geraldton Port to site are summarised below in Table 5 and illustrated in Figure 6-3.

**Table 5: Longlist of routes for Geraldton Port to site**

No.	Route	Distance	Details
1	RT onto Ian Bogle Road continues to John Willcock Link > RT onto Geraldton Mount Magnet Road > RT onto Great Northern Highway near Mount Magnet. Following south along Great Northern Highway Granary Drive, LT on Great Northern Highway / Wubin-Mullewa Road intersection at Wubin > LT slip lane to turn right onto Brand Highway > RT into site.	939km  Follows highest OSOM network possible – 36.5m Oversize Road Train	5x turns  9x signalised intersections  2x roundabouts  5x structures above  2x on structure
2	RT onto Ian Bogle Road continues to John Willcock Link > continues to John Willcock Link > RT Brand Highway > RT Brand Highway (at Yardarino) > LT into site.	282km  All 27.5m Oversize B-double	3x turns  5x signalised intersections  0x roundabouts  0x structures above  6x on structure
3	RT onto Ian Bogle Road continues to John Willcock Link > (RT) Geraldton Mount Magnet Road > (RT) onto Goulds Road > (RT) Rudds Gully Road > (LT) on Brand Highway > (RT) Brand Highway (at Yardarino) > (LT) into site.	286km  All 27.5m Oversize B-double	6x turns  7x signalised intersections  0x roundabouts  4x structures above  4x on structure

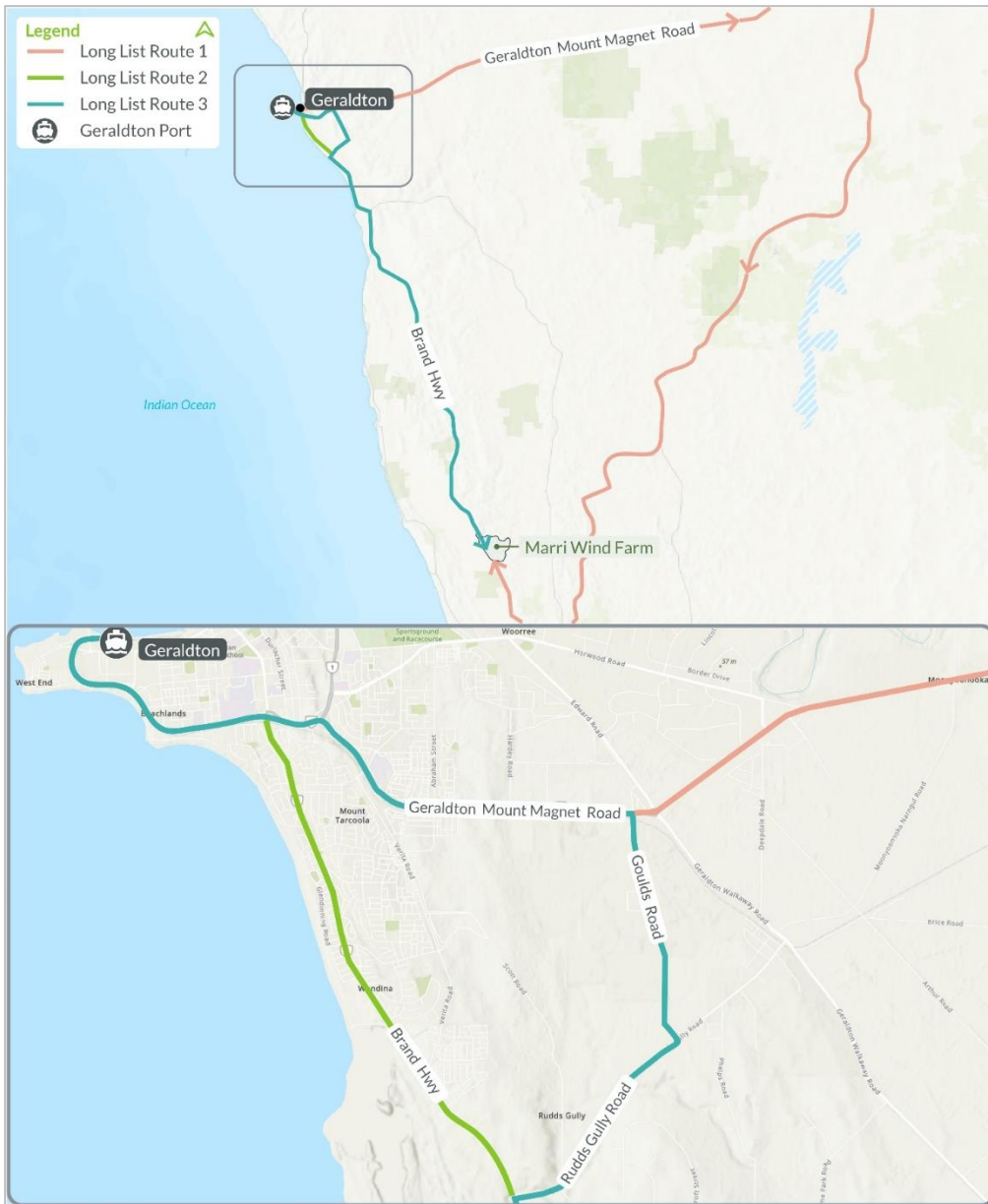


Figure 6-3 Geraldton Long list map

## 6.2 Stakeholder engagement

Once the long list of routes was considered, stakeholder engagement was undertaken to understand the local conditions at each port in addition to the broader transport network constraints. The key points from these meetings are provided below. Note this information was provided in relation to the specific project and should not be relied upon for other purposes.

### 6.2.1 Geraldton Port – Mid West Ports Authority

Mid-West Ports Authority is the current operation and facility managers for the Geraldton Port, and so were consulted as part of this study. The key discussion points are summarised below:

- Currently only single berth available for receipt of wind turbine equipment (Berth 6). This has recently handled 82m wind turbines with storage provided at the port (area north of Berth 7).

Currently can only handle one ship per month, and so a large project if required for transportation now, would take a significant duration.

- New berth (Berth 1) planned with construction to commence Q1 2026 and be complete by end of 2027, or early 2028. This would facilitate wind turbines up to 95m. This will increase capacity significantly with estimate to be able to handle four ships per week.
- Longer term plans for two new berths as part of westernmost expansion (Berth 8 and 9), expected to be operation by 2028. This is designed specifically for renewable energy.
- First Point of Entry (FPOE) will be implemented by early 2027, this will allow 24 hour operation essentially doubling capacity of current port (as can load/unload 24/7).
- Current route from Berth 6 and laydown near Berth 7 can in theory allow for up to 91m long blade (tested by Rex J Andrews – noting config of truck is important). Some minor amendments are required to do this but these can be undertaken right away if needed. Port maximising plan will address these requirements, which will be ready by end of 2026/ early 2027.

### 6.2.2 Australian Maritime Complex (AMC) Port – Ventia

Ventia is the current operation and facility managers for the Common User Facility (CUF) of AMC, and so were consulted as part of this study. The key discussion points are summarised below:

- The Common User Facility (CUF) is available for renewable projects, which is configured with high security First Point of Entry (FPOE). 'AMC 5 Wharf' is the typical port/handling area for wind turbines at the southern end of the Port (AMC Wharf 4 is also an option).
- The southern entry from Nautical Drive onto Cockburn Road is the main egress point for OSOM vehicles. The main entry from Quill Way/ Cockburn Rd cannot accommodate blades larger than 70m. All the posts at the gate at Nautical Drive can be removed and 88 metres blades have been shown to work (as shown by desktop assessment only). Reversing out and then going forward down Cockburn Road has also been shown to be possible.
- The largest blades previously transport from the port are 81 metre blades.
- There is extensive storage area available at the port. Laydown F would be the most likely laydown area, however C, D, and E are also available if booked.
- Appears to have no operational capacity constraints currently.

### 6.2.3 Main Roads WA Heavy Vehicle Service (HVS)

HVS is responsible for regulating heavy vehicles, including Restricted Access Vehicles (RAVs), and ensuring the safe and efficient movement of freight across the state. As such, HVS are required to be consulted as part of this study. The key discussion points are summarised below:

- Tonkin Highway upgrades planned at Thomas Road intersection, where it will be extended south from here. Therefore, this intersection may be different at time of transportation requirement for project (timing not confirmed). Thomas Road east of Kwinana Freeway also has three roundabouts which are not preferred for the transportation of turbine blades.
- There is the need to be aware of operational hours inside and outside the Perth Metropolitan area as follows:
  - Inside the Perth Metropolitan area (For route from AMC Port to just south of Muchea – 2km south) - can only operate vehicles at night to avoid impact with general traffic. Time period of 9.30pm to 5am. Muchea Road Train Assembly Area is part of Metro boundary.

- Outside of Metropolitan area – Can only operate during the day for visibility (sunrise to 7.30pm).
- The recommended route for transporting wind turbines from AMC through Perth metropolitan area from south to north would utilise Kwinana Freeway and then Roe Highway and Tonkin Highway, rather than Thomas Road and then Tonkin Highway. It was recommended to talk further about recent studies completed by RJA who have considered the same route.
- Overhead constraints are caused by transportation of tower sections, which can be over 6.5m. A specific route would need to be selected allowing high loads through Perth metropolitan area. The general idea for this is utilising Thomas Road, Tonkin Highway and then a number of local roads and contraflow options adjacent to the airport (e.g. Abernethy Drive) prior to joining back onto the Roe Highway and travelling up the Great Northern Highway. It was recommended to talk further with RJA about this. The key contraflow option available for high overhead OSOM includes utilising the on-ramps of Tonkin Highway at Roe Highway and Abernethy Road interchanges (see proceeding sections for further details of additional engagement).
- Muchea Road Train Assembly Area – There will be challenges with utilising this given it would likely have other vehicles also using site, which could restrict access in and out if they come in after our vehicles (e.g. through the night). Therefore, this would require coordination. Inspection bays could be an alternative to the above, typically around 139m long but only 10m wide so would likely be difficult to fit two combinations next to each other (normally transported in pairs). Also not permitted to block access and need to consider operation hours, as would have a small window of allowable operation for metro and outside of metro operating times. This is to be considered by transport operator when engaged.
- Outside of metro would require passing opportunities approximately every 20km to let traffic past (requires pilot vehicles and variable message sign vehicles – refer to High Risk OSOM Guidelines for further details of traffic warden requirements).
- The potential trip volumes for transportation of components (see Table 3) are typical of what you would expect and are possible to be accommodated by the transport network including high haulage routes. Coordinating operational windows, traffic management, transport fleet, impacts from other projects (which are also transporting) etc would need to be managed by a logistics operator.

#### 6.2.4 Rex J Andrews Pty Ltd (RJA)

RJA is a specialised transport contractor that are highly experienced in the transportation of wind turbines and other large equipment in WA. RJA were consulted to help inform the study. A meeting was held between representatives from Alinta Energy, RJA and Aurecon on the 20<sup>th</sup> June 2025 to discuss the Marri Windfarm Project. The key discussion points are summarised below:

- Geraldton Port
  - RJA team would have a general preference for using the Port of Geraldton for projects similar to this based on their experience and note that the Geraldton Port is the main port being used by other windfarms in the area.
  - Discussed preferred routes, noting use of Geraldton Mount Magnet Road and Goulds Road for heading south.
- AMC Port
  - Discussed preferred routes, noting Thomas Road is not preferred in the above because of the constrained left turn if getting onto the Kwinana Freeway and the three roundabouts if getting onto the Tonkin Highway.

- Driving in metro permitted at night only, whereas outside of metro is during day. This means that journey from AMC to site will have a two-day turnaround.
- RJA note that switching between night and day shift leads to greater fatigue considerations for drivers
- Tilt trailers can only operate up to 15km/hr, and typically introduce safety concerns. Usually handle blades smaller than what we are considering. Also limits amount of equipment available and so increases transportation timeframes. They would also require a cleared area close to site entrance where they are transferred from non-tilt trailer to tilt trailer. Therefore, were not recommended for this project.

## 6.2.5 Main Roads WA Gascoyne Region

Main Roads Gascoyne Region (MRGR) manages the state road network within the Gascoyne Region, which encompasses the potential routes in and surrounding Geraldton. In addition, MRGR are responsible for managing the Brand Highway which is adjacent to the Marri Windfarm project site. A meeting was held on the 24<sup>th</sup> July 2025 between representatives from MRGR, Alinta Energy and Aurecon to discuss the Project and the key discussion points from that meeting have been summarised below:

- An adjacent wind farm proponent (Yathroo Wind Farm) has just lodged their DA, which proposes to utilise Dandaragan Road as the primary access to site from AMC Port. It is uncertain what level of detail has been undertaken with these investigations (i.e. environmental impacts) as confirm this as the most appropriate access point.
- Another Wind Farm located further north, is currently sending clearance envelopes to Main Roads Gascoyne that has the same turns as Long List Route No.3.
- Goulds Road and Rudds Gully Road are Council Roads (City of Greater Geraldton). It is recommended we let them know that we are considering these routes as part of our route assessment.
- Southeast corner at Dandaragan Road would need to consider drainage infrastructure if upgraded.
- Brand Highway will see upgrades to the north and south of the project site, but not immediately adjacent to the site. However, the mentioned widening and overtaking lane projects could impact routes from both ports (as are both north and south of project site). This will need to be considered as part of the Traffic Management Plan (TMP) to be developed by the transport operator closer to time of transportation task.
  - Brand Hwy - Widening from Badgingarra to Eneabba - 151 - 224 SLK (approved 25/26). This is north of our project site.
  - Brand Hwy - Construct new overtaking lane - 166-169 SLK (approved 25/26). ). This is north of our project site.
  - Brand Hwy - Extend Overtaking Lane -187-189 SLK (approved 25/26). This is north of our project site.
  - Brand Hwy - Construct new overtaking lane - 36.70 - 39.20 SLK (Not yet approved – future FY). This is south of our project site.
  - Brand Hwy - Extend Overtaking Lane - 34.20 - 35.30 SLK (Not yet approved – future FY). This is south of our project site.

- Passing opportunities should be considered by transport operator, but note parking opportunities are provided along the route and shoulders can also be used (up to transport company and proponent to determine).

### 6.3 Preferred routes

Based on the long list evaluation and stakeholder engagement, a more detailed assessment of potential routes was undertaken to determine feasibility and impacts. Additional route path information was considered such as cutting through access tracks between roads, travelling on the opposite side of the road ('contraflow') and gradients of slopes.

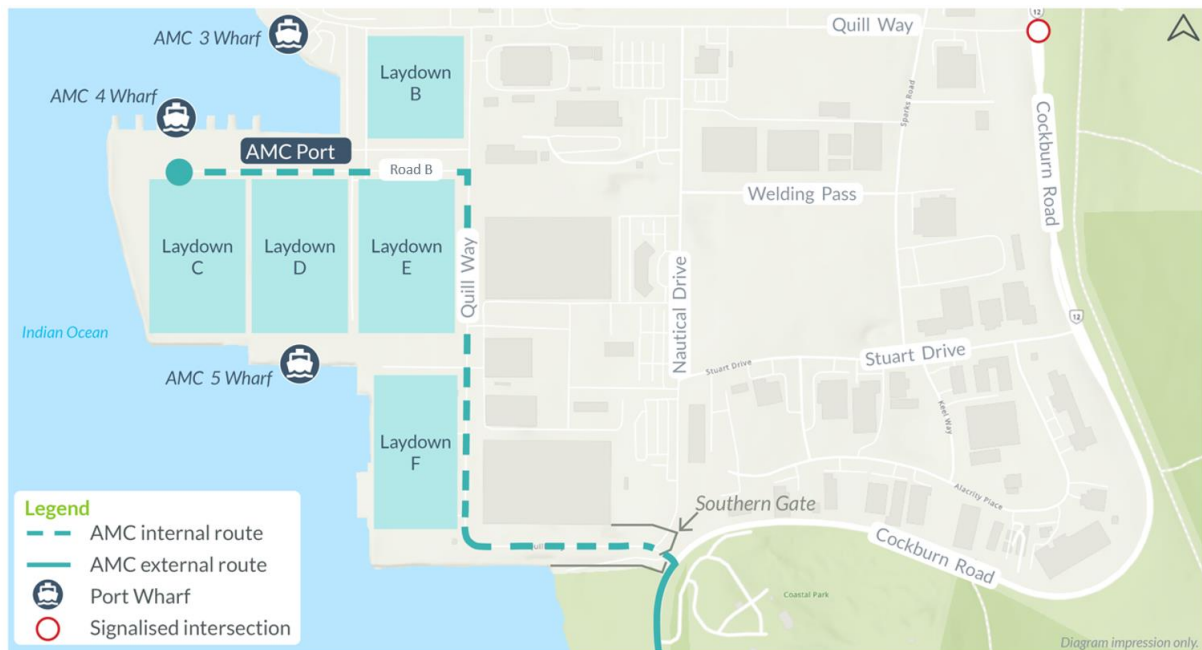
From this, it was most evident that overhead height would prove to be a challenge when travelling through the Perth metropolitan area as required from AMC Port to site (less so the case for Geraldton Port to site). Therefore for AMC Port to site, the preferred routes may vary depending on transportation of particular parts of the wind turbines. The turbine blades represent the longest combination load, and so provide challenges with navigation at constrained turns. The tower sections represent the highest combination load for specific wind turbine equipment, and so provide challenges with navigation under overhead constraints. Based on this, there are two separate routes recommended from AMC Port to site. From Geraldton Port to site, the same route can be utilised for all components.

It is assumed that the tower sections are the highest overhead component to be transported, and the blades are the longest component to be transported. However, it is acknowledged that the substation transformer is also one of the worst case OSOM movements. As advised by Alinta, a 190 tonne transformer is to be adopted. Based on Aurecon's experience on similar projects, it is unlikely that this will exceed the spatial requirements of the wind turbine components, and so is assumed to be the case.

### 6.1 AMC Port

From the stakeholder discussions with the AMC Port, it was discussed that the southern gate of the Port is the primary exit gate for large building components (wind turbine blades), as the main access from Quill Way further north is restrictive and cannot accommodate blades larger than 70m long. The gate and fencing can be dismantled to allow for larger blades to exit onto Cockburn Road. An overview of the location of the southern entrance gate from the AMC Port and the laydown areas is shown in Figure 6-4.

Various laydown areas could be used, such as C, D, E or F. Whilst Laydown F is the most likely to be used (based on stakeholder engagement), analysis should also consider vehicular access from Laydown C, D and E (i.e. using Road 5 and turning onto Quill Way to identify impacts – see Figure 6-4). It is assumed that the area within each laydown area would be available to provide turnaround of vehicles.



**Figure 6-4 AMC Port layout and internal route**

### 6.1.1 Preferred Route 1

The preferred route for AMC Port for the turbine blades is summarised in Table 6 and presented in Figure 6-5. The basis of this selection is as per Main Roads recommendations to avoid the Thomas Road/ Tonkin Highway intersection (and instead use Kwinana Freeway) as this is planned to be changed as part of the Tonkin Highway extension south. This is because upgrade of configuration, or construction impacts (date not yet confirmed) could impose spatial restrictions that would limit the ability for transportation of blades. Furthermore, it is well understood (based on stakeholder discussions) that the three roundabouts on Thomas Road introduce challenges for blade transportation. Furthermore, using Kulija Road to access Kwinana Freeway provides more space to navigate turn (in comparison with Thomas Road interchange – as confirmed in stakeholder discussions).

This route can accommodate a maximum loaded height of 5.6m, where the lowest unavoidable structure is Stanton Road overpass (5.6m). This will be able to transport the blades, which typically do not exceed 5m in height once loaded on the vehicle (including transport frame).

**Table 6 Overview of AMC Port Preferred Route 1**

Longlist route No.	Port	Route Summary	Route Distance	Number of turns	Maximum height
Option 4	AMC Port	Cockburn Road, Rockingham Road, Mandurah Road, Kwinana Freeway, Roe Highway and Tonkin Highway, Brand Highway	203km	8	5.6m

Starting at AMC Port: At Nautical Drive (30m) > RT onto Cockburn Road continuing south (3.2km) > LT onto Mandurah Road continuing southeast, joins onto Kulija Road and Mundijong Road (10.4km) > LT onto Kwinana Freeway continuing north (23.7km) > RT bend onto Roe Highway at interchange continuing east (18.5km) > LT bend onto Tonkin Highway at interchange continuing northwest and north (54.5km) > LT bend onto Brand Highway at interchange continuing west and north (89km).

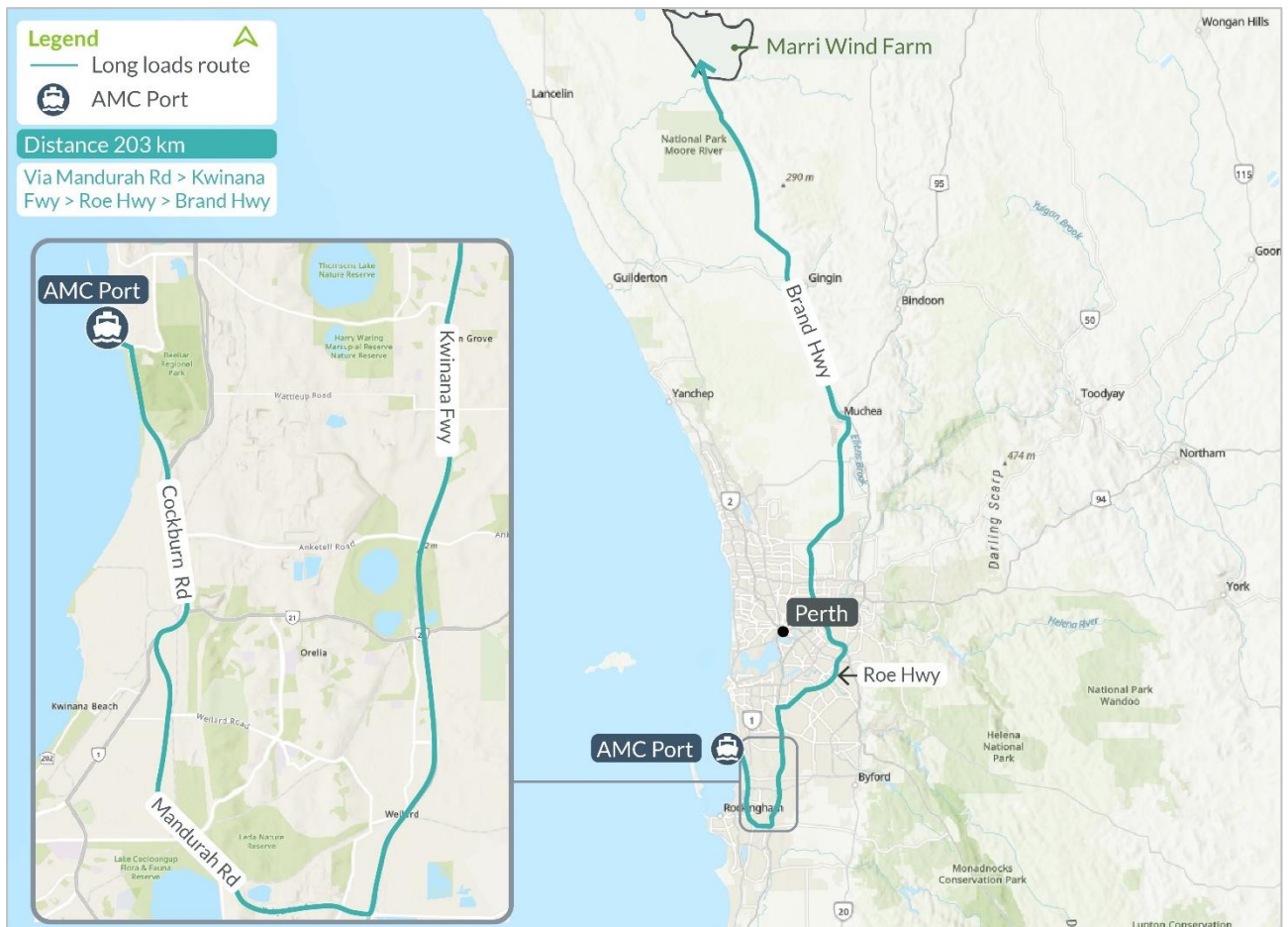


Figure 6-5 AMC Preferred Port Preferred Route 1 (Source: Aurecon GIS)

### 6.1.2 Preferred Route 2

An alternate route has also been investigated, with the intent to understand if an increased overhead loaded height can be achieved. The basis for the alternate route for AMC Port is summarised in Table 7 and shown in Figure 6-6. This instead utilises Thomas Road and Tonkin Highway (rather than Kwinana and Roe Freeways for Preferred Route 1) as the additional requirements for space to accommodate blade lengths would not be required, and is also a more simple route. Furthermore, this route has no overhead structures up to the Roe Highway/ Tonkin Highway interchange whereas Preferred Route 1 would have been limited to 6.18m to get to this point (even if using on/off ramp deviations at all possible points).

If transport loads remain on the primary route of Tonkin Highway (from Roe Highway/ Tonkin Highway interchange and north), this route can also only accommodate a maximum loaded height of 5.6m, due to Stanton Road overpass. Dunreath Drive (5.5m) must be avoided with use of on/off ramps. Dependant on selected OEM, this route should be acceptable for transportation of all other components for the wind turbines, except the tower sections, which require an overhead clearance above 5.6m. Alternate 'sub-routes' are subsequently discussed below.

Alternate 'sub-routes' have also been investigated here for transportation of components requiring overhead clearance exceeding 5.6m (i.e. tower sections). Note as per the Basis of Design (see Section 5), the vertical clearance requirement is 6.8m to accommodate tower sections. To avoid limitations of overhead structures on Tonkin Highway, sub-routes would have to deviate off the Tonkin Highway adjacent to the area near Perth Airport. Two preliminary options have been identified, which

are detailed in Figure 6-6 and Figure 6-7. Both routes require contraflow movements and ultimately connect onto the Roe Highway. Connection onto Roe Highway is shown following structures which would have limited overhead height, including the Roe Highway/ Maida Vale Road overpass (5.48m) and Roe Highway/ Bushmead Road overpass (5.6m).

Note the above alternate sub-routes would be subject to the selected vehicle configurations from the specific transport operator. HVS requires these vehicles are below the high-risk OSOM dimensions of 50m length, as to facilitate movements. Loading of towers on platform trailers rather than bookend trailers (bookends used when overhead height is heavily constrained but results in longer combination lengths) would result in shorter combination lengths and so would help facilitate use of the alternative sub routes. Note, the use of bookends to lower the height of tower transportation could be considered if tower sections have a diameter that permits loads less than 5.6m in height (subject to OEM selection – may not be an option for any), and so in this case could use the main route of Preferred Route 2 (i.e. continue up Tonkin Highway).

As noted previously, a potential option through the airport (Horrie Miller Drive> Paltridge Road> Kingsford Smith Avenue> Grogan Road> Abernethy Road) was also omitted from this section, as Grogan Road will be permanently closed in early 2026 (as advised by HVS).

Furthermore, deviation around the interchange at Brand Highway/ Great Northern Highway is required for loads exceeding 6.2m, if coming up Great Northern Highway (as per alternative sub-routes). This is also shown below, with a potential alternative to minimise contraflow travel, as documented under stakeholder engagement (see Section 6.2.4 – RJA).

**Table 7 Overview of AMC Port Preferred Route 2**

Longlist Route No.	Port	Route Summary	Route Distance	Number of turns	Overhead clearance
Longlist Option 3	AMC Port	Cockburn Road, Rockingham Road, Thomas Road and Tonkin Highway, Brand Highway	195km	6	5.6m

Starting at AMC Port: At Nautical Drive (30m) > RT onto Cockburn Road continuing south (3.2km) > LT onto Thomas Road continuing east (18.4km) > LT onto Tonkin Highway continuing north (80.3km), LT bend onto Brand Highway at interchange continuing west and north (80km).

**Alternate sub-routes at area adjacent to Perth Airport:**

Tonkin Highway to Abernethy Road

Sub-route No. 1 (unrestricted/will allow 6.8m height) – See Figure 6-7. For further details, refer to the Main roads contraflow movement diagram included in Appendix A.

Cross onto opposite side Tonkin Highway at Hale Road intersection> Continue onto Tonkin Highway On-ramp (contraflow – 2.4km)> RT onto Tonkin Highway on-ramp (contraflow).

Option 2 (maximum height of 6.4m – Tonkin Hwy/ Abernethy Rd off-ramp footbridge) – see Figure 6-7

LT onto Roe Highway off-ramp> Continue onto Tonkin Highway On-ramp (2km)> LT from Tonkin Highway onto Abernethy Road off-ramp > RT Abernethy Road continuing west (1.6km) > RT onto Kewdale Road continuing north (900m) > RT Tonkin Highway continuing southeast (1.2km) > LT onto Tonkin Highway on-ramp (contra-flow).

Option 1 and 2 (Abernethy Road to site)

LT onto Abernethy Road > RT onto Great Eastern Highway Bypass continuing east (600m) > LT onto Stirling Crescent continuing north (0.7 km) > RT onto Bushmead Road continuing east (0.5km) > LT onto Military Road continuing (230m) > Merge right onto Roe Highway through access track continuing north (6.3km) > RT onto Great Northern Highway continuing north (34.6km) > Slight left turn onto access track continuing north (800m) adjacent to interchange > 180 degree LT onto Great Northern Highway continuing south (900m) at interchange on opposite side of road > RT bend onto Brand Highway at interchange continuing west and north (89 km).

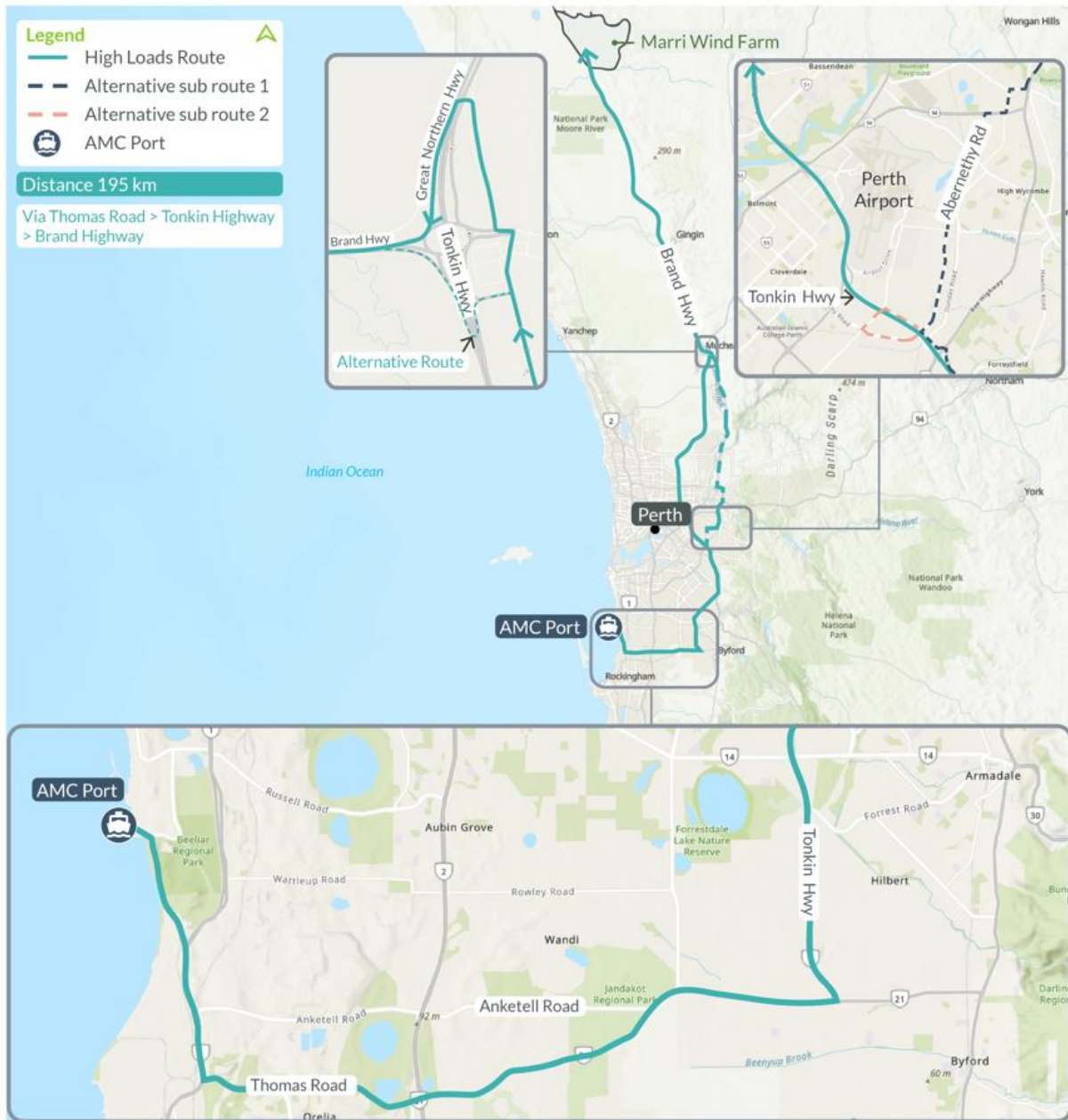


Figure 6-6 AMC Preferred Route 2 (Source: Aurecon GIS)

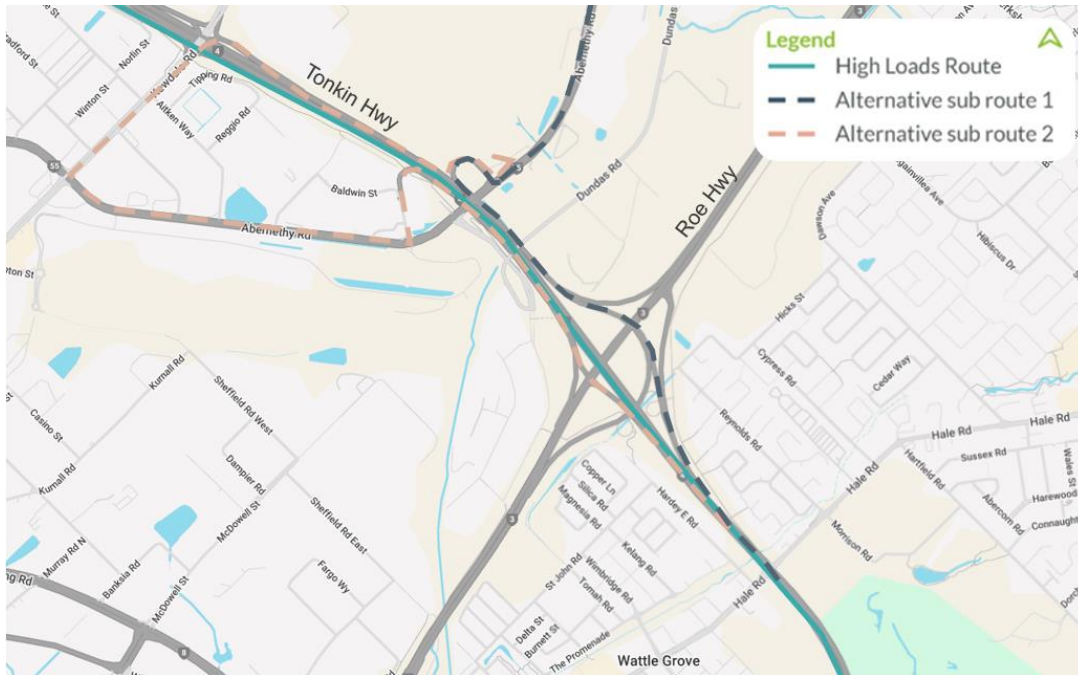
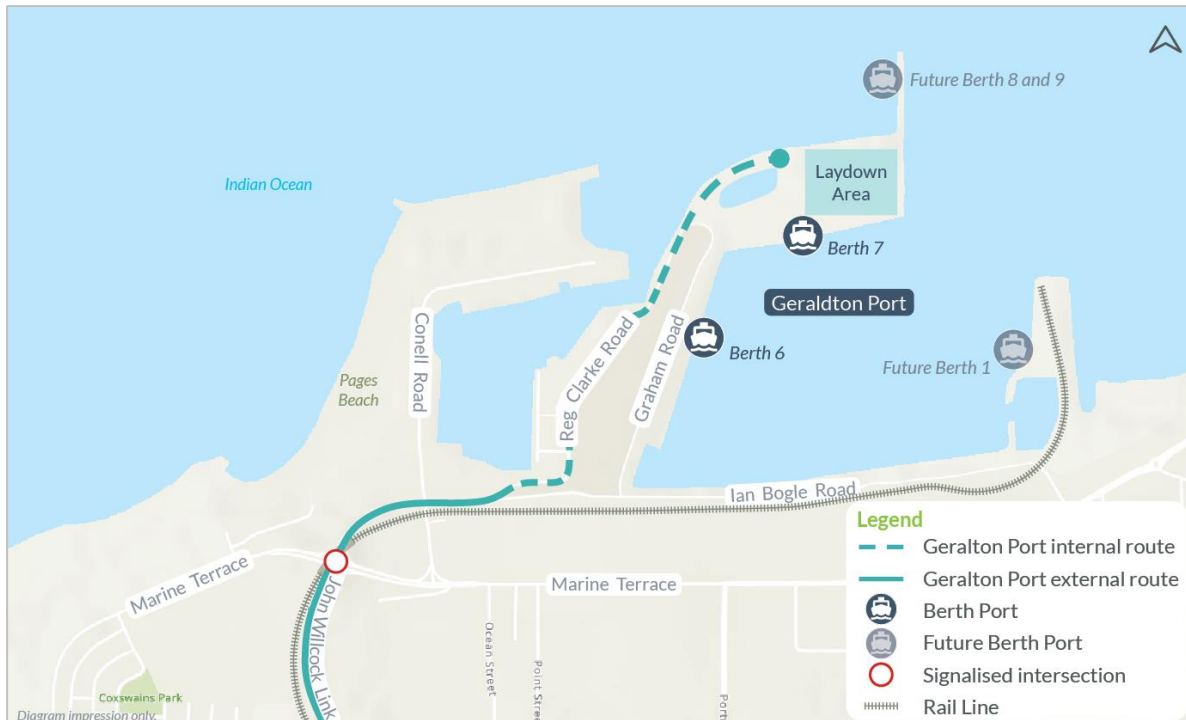


Figure 6-7: Sub-route details

## 6.2 Geraldton Port

From the stakeholder engagement with the Port of Geraldton, it was discussed that Reg Clarke Road would be utilised as the internal route to connect from Berth 6 and the laydown area to the external road network (see Figure 6-8). As per stakeholder discussions, an assessment has been previously undertaken that shows a 91m blade can be transported for this internal route with minor modifications (expected to be implemented early 2026) and so for the purposes of this study, is assumed to be made possible at the time needed for the Project (late 2026 and on).



**Figure 6-8: Geraldton Port layout and internal route**

**6.2.1 Preferred Route**

The preferred route for Geraldton Port is summarised in Table 8 and presented in Figure 6-9. This avoids the tight turn from John Willcock Link onto Brand Highway (Longlist Route No. 2) and the adjacent urban area (including overhead powerlines). This route also traverses area adjacent to Goulds Road, which provides options of storage. Furthermore, it is significantly shorter than Longlist Route No. 1, which utilised the highest order OSOM route possible (totalling 939km).

The preferred route can accommodate a maximum loaded height of 6.8m. Note this requires use of the formed bypass at Highbury Street and Abraham Street bridges, which consists of a slight deviation off road to travel under higher section of span.

**Table 8 Overview of Geraldton Port Preferred Route**

Longlist Route No.	Port	Route Path	Route Distance	Number of turns	Maximum height
Option 3	Geraldton	Ian Bogle Road, John Willcock Link, Geraldton Mount Magnet Road, Goulds Road, Rudds Gully Road, Brand Highway	287 km	6	6.8m

Starting at Ian Bogle Road > continuing west and turning south (450 m) > continues south onto John Willcock Link continuing south and east (4.8 km) > RT Geraldton Mount Magnet Road continuing east (5.3 km) > RT onto Goulds Road continuing south (3.5 km) > RT onto Rudds Gully Road continuing east (3.6 km) > LT on Brand Highway continuing south and east (62.1) > RT onto Brand Highway (at Yardarino T-intersection) continuing south (205.5 km) > LT into site.

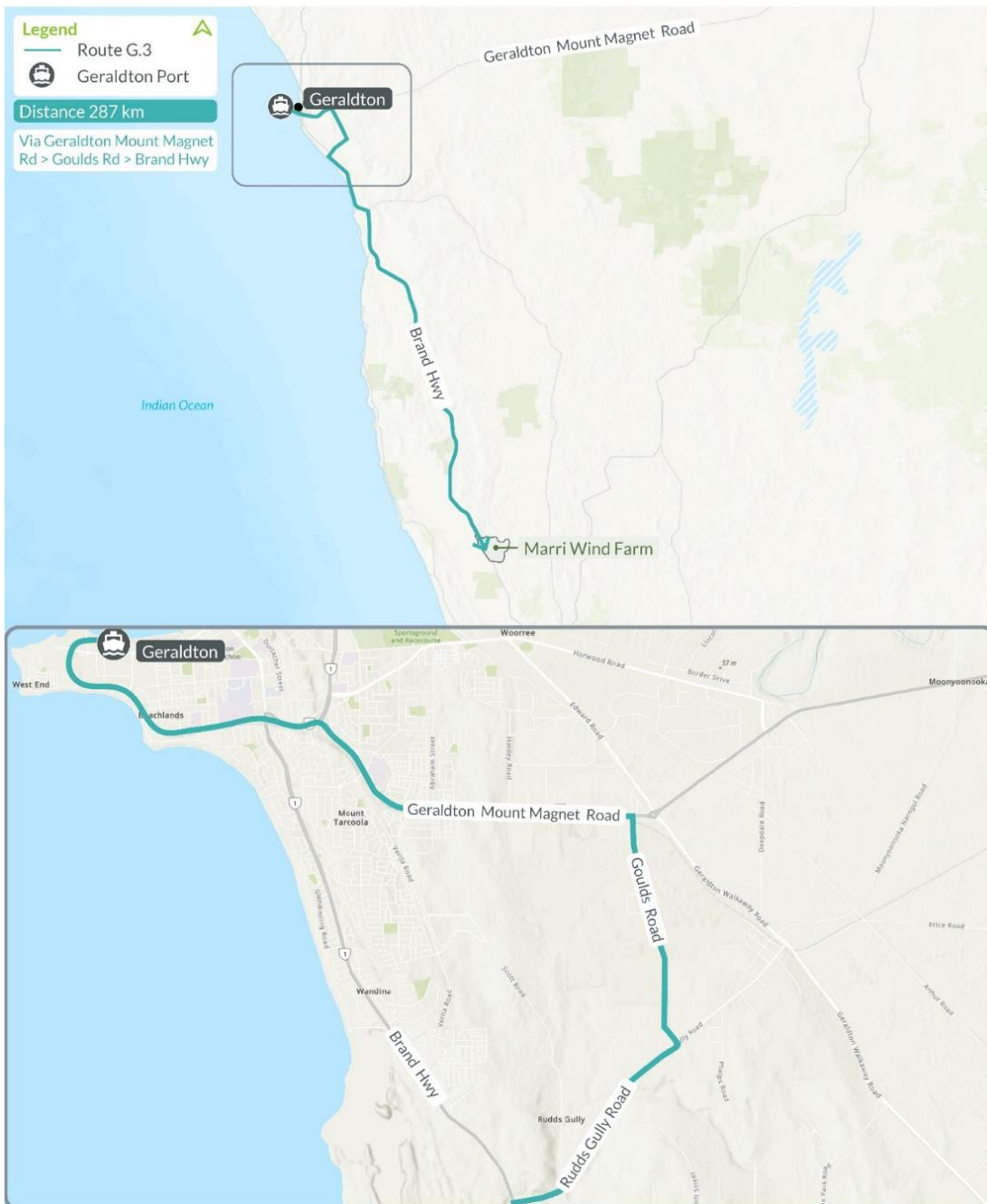


Figure 6-9 Geraldton Port Preferred route (Source: Aurecon GIS)

### 6.3 Swept path analysis

A swept path analysis is required to understand the spatial requirements for transporting the turbine blades from port to site. Vehicle tracking was completed using AutoTURN, a third-party CAD software developed by Transoft Solutions Inc., to determine the swept path of the test vehicle. The existing blade transporter models in AutoTURN were modified to suit the test vehicle, and the dimensions were adjusted to meet the required specifications.

The analysis focused on all turning points where the turning radii was less than the minimum radii required to stay lane correct (i.e. within the traffic lane). It was assumed that OSOM measures would

be in place, allowing the design vehicle to utilise the full paved area without staying lane correct. The following should be noted for all swept paths conducted as part of this study:

- The purposes of this review is to provide high-level insight of potential conflicts with the design vehicle as to inform the initial stages of the Project
- Identified conflicts should be verified on-site. This current review is a desktop study only (and subject to change based on any changes on-site).
- No detailed vertical geometry checks (e.g. no survey data reviewed).
- Further detailed swept path analyses required to determine cost of temporary works (e.g. quantities for hardstands)
- Swept paths may vary based on variations in preferences across OEM specifications and transport operator equipment/methodology.

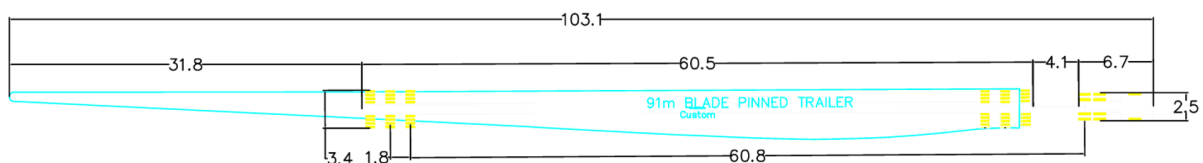
### 6.3.1 Design vehicle parameters

Table 9 outlines the key parameters of the design vehicle used in the swept path analysis. The primary test vehicle selected is based on the Vestas V172 85m Blade Pinned Trailer which is modified to accommodate a 91m, with two thirds of blade supported on trailer and one third overhanging. Note the amount of overhang of blade can vary across OEM specifications and also transport operators preferences (related to trailer configuration etc). However, it is Aurecon’s understanding that proposed test vehicle with one-third of blade overhanging the rear trailer axles is the most suitable assumption for this study, as it balances the amount of rear blade sweep (i.e. further increase in rear blade overhang increases impacts on outside of turn) and trailer manoeuvrability (i.e. decrease in rear blade overhang means trailer is longer which increases impacts on inside of turn). This configuration was presented to the transport operator (RJA) as part of the stakeholder engagement who agreed that this configuration appeared most realistic. The adopted test vehicle is mentioned throughout this study as ‘91m Blade Pinned Trailer’.

**Table 9 Design parameters of design vehicle – 91m Blade Pinned Trailer**

Design Parameter	Design Value
Prime mover width	2.5 m
Prime mover length	6.7m
Trailer width	3.4m
Trailer body width (with blade)	5m
Trailer length	60.5 m
Lock to Lock Time	6 seconds
Rear wheel configuration	Set to rear-steerable
Steering Lock Angle	40 degrees
Articulating angle	40 degrees
Assumed speed (turning movement)	5 km/h
Trailer axle spacing	1.8m

Design Parameter	Design Value
Rear blade overhang	31.8m
Combination length	103.1m
Swept Path Clearance Envelope	0.5 m



**Figure 6-10: Design vehicle envelope**

### 6.3.2 Outcomes

The 91m Blade Pinned Trailer was used to perform the vehicle tracking analysis, estimating the extent of the wheelbase and body as the vehicle navigated various turns. The analysis assessed whether realignment would be required and identified any potential impact on surrounding vegetation and infrastructure. At intersections where the design vehicle wheels cannot complete the turn without leaving the paved area, strengthening, widening or realignment will be required. In some instances, light poles, traffic poles, and signage will require temporary relocation, removal or replacement.

The turns tested along the blade routes are shown in Figure 6-11, Figure 6-12 and Figure 6-13 Figure 7-1, and key conflicts are summarised in Table 10 and Table 11. Shapefiles are provided electronically with this report. Refer to Appendix B for imagery of swept paths and conflicts.

The conflict rationale/assumptions are listed below:

- Low height objects (i.e. less than 1.5m) such as signs can remain if is only the swept path of the blade over sail (i.e. the section overhanging off back of the trailer). Will require removal if actual truck envelope is over. Actual height of rear over sail dependant on final trailer configuration and OEM.
- Vegetation trimming rather than clearing may be an option for some situations just like above (i.e. if only blade over sail)
- Based on Near map aerial imagery and Google aerial imagery and Streetview only (site visits excluded from scope)
- Whilst remaining within road pavement is prioritised, traversing outside of this (i.e. over kerbs and onto shoulders and verges) is avoided where possible
- General order of priority for avoiding conflict with typical infrastructure elements: Structure, traffic poles, light poles, signs

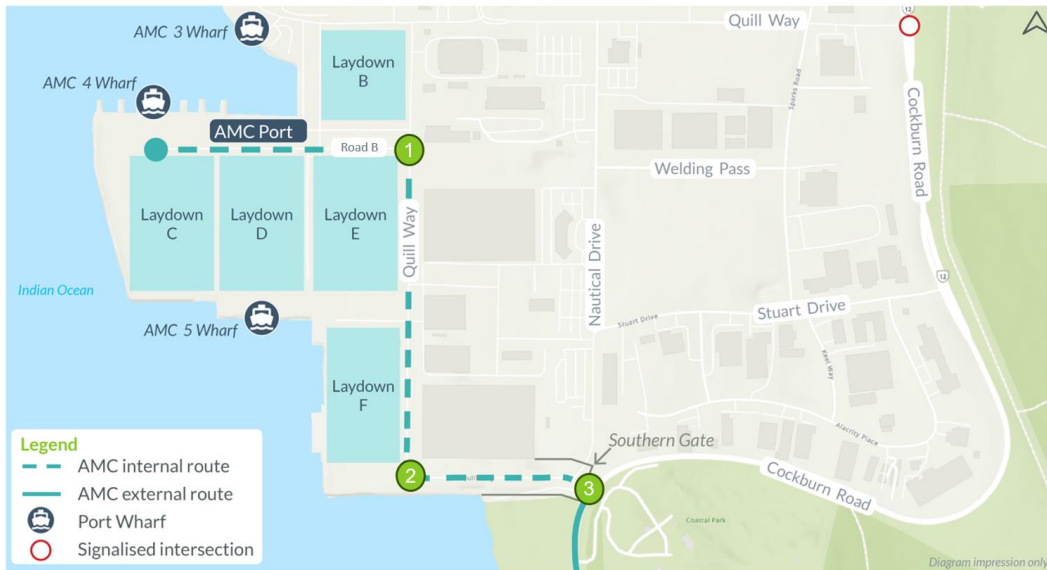


Figure 6-11: Swept path locations at AMC Port

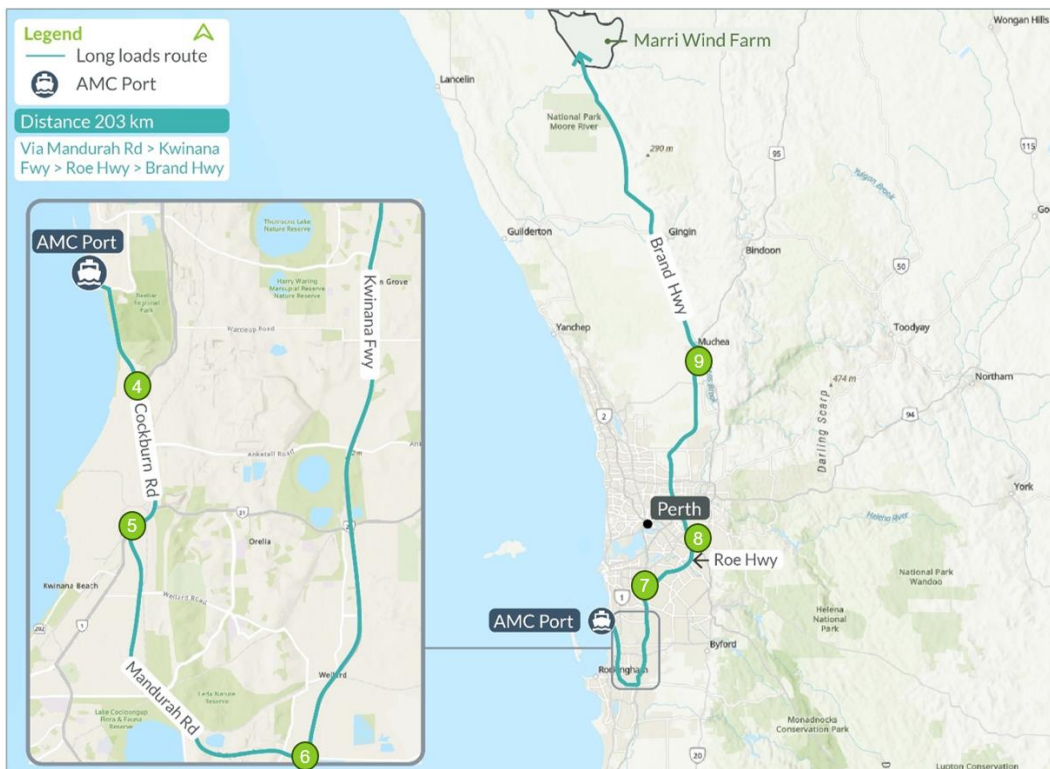


Figure 6-12: Swept path locations outside of AMC Port

Table 10: AMC Port to site swept path analysis

No.	Location	Movement	Impacts
1	CUF Road B/ Quill Way	Right turn onto Quill Way. Note this movement may not eventuate (dependant on wharf and laydown selected)	<ul style="list-style-type: none"> <li>■ Jurisdiction <ul style="list-style-type: none"> <li>– AMC Port</li> </ul> </li> <li>■ Over sails Laydown B or cuts corner of Laydown E (will require reserving some of holding area)</li> <li>■ Traverses 90 degree parking on Quill Way opposite intersection (close approximately 25 bays)</li> </ul>
2	Quill Way South end	Left turn around corner toward southern exit	<ul style="list-style-type: none"> <li>■ Jurisdiction <ul style="list-style-type: none"> <li>– AMC Port</li> </ul> </li> <li>■ Traverses some 90 degree parking on east-west section of Quill Way (close approximately 5 bays)</li> <li>■ Over sails Laydown B (will require reserving some of holding area)</li> </ul>
3	Quill Way/ Cockburn Road	<p>Right turn through gates onto Cockburn Road</p> <p><u>Alternative</u> - Reverse out to avoid significant impacts (see second row of impacts)</p>	<ul style="list-style-type: none"> <li>■ Jurisdiction <ul style="list-style-type: none"> <li>– AMC Port</li> <li>– City of Cockburn</li> </ul> </li> <li>■ 4x Light poles (relocate)</li> <li>■ Over sails carpark to north (requires some closure)</li> <li>■ Likely conflict with structure to north (uncertain if this can be relocated)</li> <li>■ Gate (remove)</li> <li>■ Vegetation on north side of Quill Way and gate (requires trimming to allow over sail)</li> <li>■ Leaves road surface on east side of Cockburn Road (requires hardstand)</li> <li>■ Vegetation on east side of Cockburn Road (requires clearing)</li> </ul> <hr/> <ul style="list-style-type: none"> <li>■ Jurisdiction – same as above</li> <li>■ 2x Light poles (relocate)</li> <li>■ Leaves road surface at security gate/fence (requires hardstand)</li> <li>■ Vegetation at security gate/fence (requires clearing)</li> <li>■ Vegetation on east and north sides of Cockburn Road (requires clearing or trimming)</li> </ul>

No.	Location	Movement	Impacts
4	Cockburn/ Rockingham Road	<p>Right turn through intersection on opposite side of road (contraflow) to Rockingham Road and then travel on opposite side of until 200m where veer over to correct side of road</p> <p><u>Alternative</u> – Right turn through intersection on correct side of road to Rockingham Road</p>	<ul style="list-style-type: none"> <li>■ Jurisdiction <ul style="list-style-type: none"> <li>– Cockburn Road - City of Cockburn</li> <li>– Rockingham Road – Main Roads WA Metropolitan</li> </ul> </li> <li>■ 2x Signs (relocate)</li> <li>■ Traverses traffic island at intersection (make trafficable)</li> <li>■ Traverses traffic island further south (make trafficable)</li> <li>■ Vegetation on traffic island for above (clear for under vehicle and trim where next to vehicle)</li> <li>■ Note power pole close to swept path</li> <li>■ Note overhead utilities (confirm adequate clearance)</li> </ul> <hr/> <ul style="list-style-type: none"> <li>■ Jurisdiction – same as above</li> <li>■ 2x Traffic poles (modify/relocate)</li> <li>■ 2x Signs (relocate)</li> <li>■ Vegetation to north (trim to allow over sail)</li> <li>■ Leaves road surface on eastern side of Rockingham Road (requires hardstand)</li> <li>■ Note overhead utilities (confirm adequate clearance)</li> </ul>
5	Rockingham Road/ Mandurah Road	Left turn through intersection onto Mandurah Road	<ul style="list-style-type: none"> <li>■ Jurisdiction <ul style="list-style-type: none"> <li>– Rockingham Road – Main Roads WA Metropolitan</li> <li>– Mandurah Road - City of Kwinana</li> </ul> </li> <li>■ 1x Traffic pole (modify/relocate)</li> <li>■ 1x Sign (relocate)</li> <li>■ Note one light pole close to swept path</li> </ul>
6	Kulija Road/ Kwinana Freeway	<p>Veer onto opposite side of road 300m before intersection (contraflow)</p> <p>Left turn from opposite side of road (contraflow) onto Kwinana Freeway on-ramp</p>	<ul style="list-style-type: none"> <li>■ Jurisdiction <ul style="list-style-type: none"> <li>– Main Roads WA Metropolitan</li> </ul> </li> <li>■ 4x Signs (relocate)</li> <li>■ 1x Tree in median (trim or remove)</li> <li>■ 2x Light poles (relocate)</li> <li>■ 1x Traffic pole (modify/relocate)</li> <li>■ Traverses traffic island (make trafficable – note grate at this location)</li> </ul>

No.	Location	Movement	Impacts
7	Kwinana Freeway/ Roe Highway	Left onto off-ramp with large sweeping turn from left to right onto Roe Highway	<ul style="list-style-type: none"> <li>■ Jurisdiction               <ul style="list-style-type: none"> <li>– Main Roads WA Metropolitan</li> </ul> </li> <li>■ Vegetation to west (trim to allow over sail)</li> <li>■ 4x Light poles (relocate)</li> <li>■ Note overhead utilities (confirm adequate clearance)</li> </ul>
8	Roe Highway/ Tonkin Highway	Left onto off-ramp with large sweeping turn onto Tonkin Highway	<ul style="list-style-type: none"> <li>■ Jurisdiction               <ul style="list-style-type: none"> <li>– Main Roads WA Metropolitan</li> </ul> </li> <li>■ No identified constraints</li> </ul>
9	Tonkin Highway/ Brand Highway	Left onto off-ramp with large sweeping turn onto Brand Highway	<ul style="list-style-type: none"> <li>■ Jurisdiction               <ul style="list-style-type: none"> <li>– Tonkin Highway - Main Roads WA Metropolitan</li> <li>– Brand Highway - Main Roads Gascoyne Region</li> </ul> </li> <li>■ No identified constraints</li> </ul>

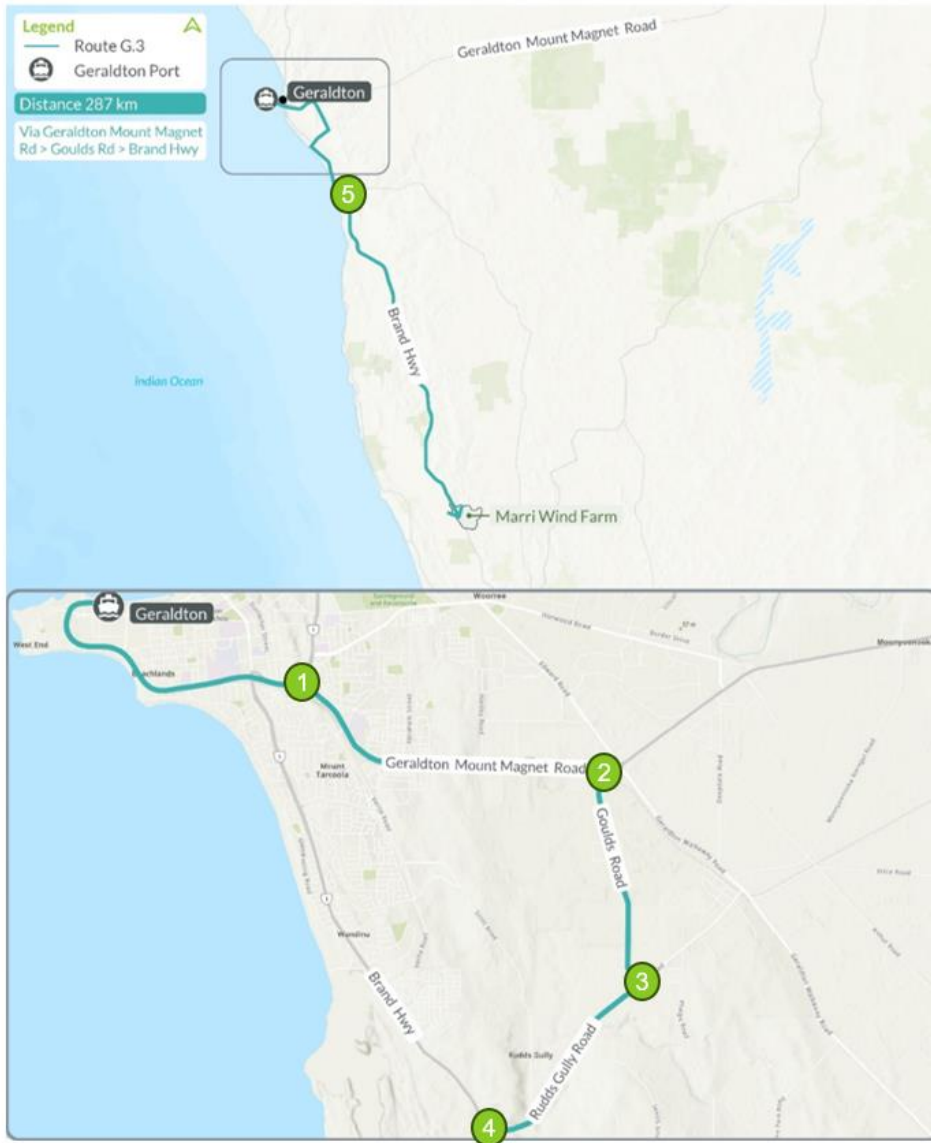


Figure 6-13: Swept path locations Geraldton Port to site

Table 11: Geraldton Port to site swept path analysis

No.	Location	Movement	Notes
1	Geraldton Mount Magnet Road/ North West Coastal Highway	Right turn across trafficable section of median and through slip lane onto Geraldton Mount Magnet Road	<ul style="list-style-type: none"> <li>■ Jurisdiction                             <ul style="list-style-type: none"> <li>– Main Roads Gascoyne Region</li> </ul> </li> <li>■ 3x Signs (relocate)</li> <li>■ Vegetation on trafficable median (trim if required)</li> <li>■ Traverses traffic island (make trafficable)</li> <li>■ Note one light pole close to swept path</li> </ul>

No.	Location	Movement	Notes
2	Geraldton Mount Magnet Road/ Goulds Road	Right turn through intersection onto Goulds Road	<ul style="list-style-type: none"> <li>■ Jurisdiction <ul style="list-style-type: none"> <li>– Geraldton Mount Magnet Road - Main Roads Gascoyne Region</li> <li>– Goulds Road – City of Greater Geraldton</li> </ul> </li> <li>■ 2x Signs (relocate or allow over sail)</li> <li>■ 3x Light poles (relocate)</li> <li>■ Leaves road surface on western corner of intersection (requires hardstand)</li> <li>■ Clear vegetation at above point</li> </ul>
3	Goulds Road/ Rudds Gully Road	Right turn through intersection onto Rudds Gully Road	<ul style="list-style-type: none"> <li>■ Jurisdiction <ul style="list-style-type: none"> <li>– City of Greater Geraldton</li> </ul> </li> <li>■ Over sail private property on east side of Goulds Road (landholder permission)</li> <li>■ Vegetation on east side of Goulds Road in private property (requires trimming to allow over sail)</li> <li>■ 1x Power Pole (relocate outside of swept path). Note one other is also close to being impacted to north.</li> <li>■ Leaves road surface on east side of Goulds Road and western corner of intersection (requires hardstand)</li> <li>■ Note overhead utilities (confirm adequate clearance)</li> </ul>
4	Rudds Gully Road/ Brand Highway	Left turn through intersection onto Brand Highway	<ul style="list-style-type: none"> <li>■ Jurisdiction <ul style="list-style-type: none"> <li>– Brand Highway - Main Roads Gascoyne Region</li> <li>– Rudds Gully Road – City of Greater Geraldton</li> </ul> </li> <li>■ Over sail private property on north side of Rudds Gully Road (landholder permission)</li> <li>■ Vegetation on north side of Rudds Gully Road in private property (may require trimming to allow over sail)</li> <li>■ Leaves road surface on north side of Rudds Gully Road (requires hardstand)</li> <li>■ Traverses traffic island (make trafficable)</li> <li>■ Note overhead utilities (confirm adequate clearance)</li> </ul>

No.	Location	Movement	Notes
5	Brand Highway/ Midlands Road	<p>Right turn through intersection onto Brand Highway</p> <p>Two options were tested here, as to try and minimise impact to vegetation. First option (preferred) cuts the corner more (increasing impact on southern corner and less impact north side of Brand Highway)</p> <p><u>Alternative</u> –</p> <p>Cuts the corner less (minimising impact on southern corner and increasing impact on north side of Brand Highway – likely requires clearing outside of road reserve so is not preferred).</p>	<ul style="list-style-type: none"> <li>■ Jurisdiction <ul style="list-style-type: none"> <li>– Main Roads Gascoyne Region.</li> <li>– Note below may have impacts outside of road reserve (private property – ‘General Farming’), which would require consultation with Shire of Irwin. To first confirm with Main Roads Gascoyne Region.</li> </ul> </li> <li>■ 3x Light poles (relocate)</li> <li>■ Vegetation on northern side of Brand Highway (requires clearing and trimming)</li> <li>■ Vegetation on southern corner of intersection (requires clearing)</li> <li>■ Leaves road surface on southern corner of intersection (requires hardstand)</li> </ul> <hr/> <ul style="list-style-type: none"> <li>■ Jurisdiction – same as above</li> <li>■ 1x Sign (relocate)</li> <li>■ 4x Light poles (relocate)</li> <li>■ Vegetation on northern side of Brand Highway (requires clearing and trimming). Over sail private property (landholder permission)</li> <li>■ Vegetation on southern corner of intersection (requires clearing)</li> </ul>

#### 6.4 Route assessment summary

A detailed review of the routes have been undertaken through this study. These initial routes were based on desktop assessment and stakeholder engagement with the relevant authorities and ports (see Section 6.1 and 6.2). After assessing the initial routes, preferred routes were determined for the transportation of the wind turbine components from each port. A summary of the evaluation of the routes is shown in Table 12.

For AMC Port to site, there are considerable overhead constraints, and so two routes are identified dependant on component being transported. Furthermore, Muchea RTAA is a logical stop-over for AMC Port to site, given it is approximately halfway along route, and is located on the border of the Perth Metropolitan area (border of change in operational requirements).

Note trailer configuration is subject to transport operator specifications as to determine total overhead height for transportation of tower components, which would impact use of Preferred Route 2 mainline, Sub-route 1, or Sub Route 2.

Table 12 Route Option Evaluation Summary

Primary Routes	Route Evaluation Considerations
<b>AMC Port</b>	
Preferred Route 1 (blades)	<ul style="list-style-type: none"> <li>■ Mandurah Road, Kwinana Freeway, Roe Highway and Tonkin Highway</li> <li>■ Overhead clearance of 5.6m</li> <li>■ 5 locations require modifications as to facilitate movement of 91m blade transportation. Two locations require contraflow (i.e. travel on opposite side of road).</li> <li>■ AMC Port requires reversing out of southern gate due to significant constraints in area, including adjacent building and tight turn at Cockburn Road.</li> </ul>
Preferred Route 2 (high loads)	<ul style="list-style-type: none"> <li>■ Main route up along Thomas Road/Tonkin Highway/Brand Highway               <ul style="list-style-type: none"> <li>– Overhead clearance of 5.6m</li> <li>– Likely suitable for most components excluding blades and tower sections</li> </ul> </li> <li>■ Alternative routes to accommodate tower sections               <ul style="list-style-type: none"> <li>– Sub-route 1 onto Abernethy Road/ Roe Highway/ Great northern Highway                   <ul style="list-style-type: none"> <li>■ This is the Main Roads high haulage route and is extensively used</li> <li>■ No overhead clearance limitation (i.e. allows 6.8m clearance)</li> <li>■ Considerable length of contraflow requiring traffic management</li> </ul> </li> <li>– Sub-route 2 onto Abernethy Road/ Roe Highway/ Great northern Highway                   <ul style="list-style-type: none"> <li>■ Overhead clearance of 6.4m</li> <li>■ Has less significant length of contraflow and so may be an alternative for some components (i.e. loads &gt;5.6m and &lt;6.4m)</li> </ul> </li> <li>– Sub-route 1 and 2 at Tonkin Highway/Brand Highway interchange                   <ul style="list-style-type: none"> <li>■ Requires contraflow to avoid overhead structure.</li> </ul> </li> </ul> </li> </ul>
<b>Geraldton Port</b>	
Preferred Route (all components including blades and high loads)	<ul style="list-style-type: none"> <li>■ John Willcock Link/ Geraldton Mount Magnet Road, Goulds Road and Brand Highway</li> <li>■ Overhead clearance of 6.8m</li> <li>■ Slight deviation off road to travel under higher section of bridge span to achieve above clearance               <ul style="list-style-type: none"> <li>– Highbury Street</li> <li>– Abraham Street</li> </ul> </li> <li>■ 5 locations require modifications as to facilitate movement of 91m blade transportation (assuming modifications at Geraldton Port/ Reg Clarke Road complete). All 5 locations require cutting through intersection on opposite site of road.</li> </ul>

## 7 Site access review

In addition to the route assessment, a review of the site access constraints was also undertaken, in addition to some preliminary checks for the internal road layout. A swept path analysis was undertaken for this to identify the impacts that require further consideration. A high-level check with Before You Dig Australia (BYDA) was also undertaken.

### 7.1 Site access

The two primary accesses into the project site are off Brand Highway, at Dandaragan Road and Gillingarra Road (see Figure 7-1). A swept path assessment is undertaken below as to analyse impacts with surrounding constraints. Refer to Appendix C for further details.

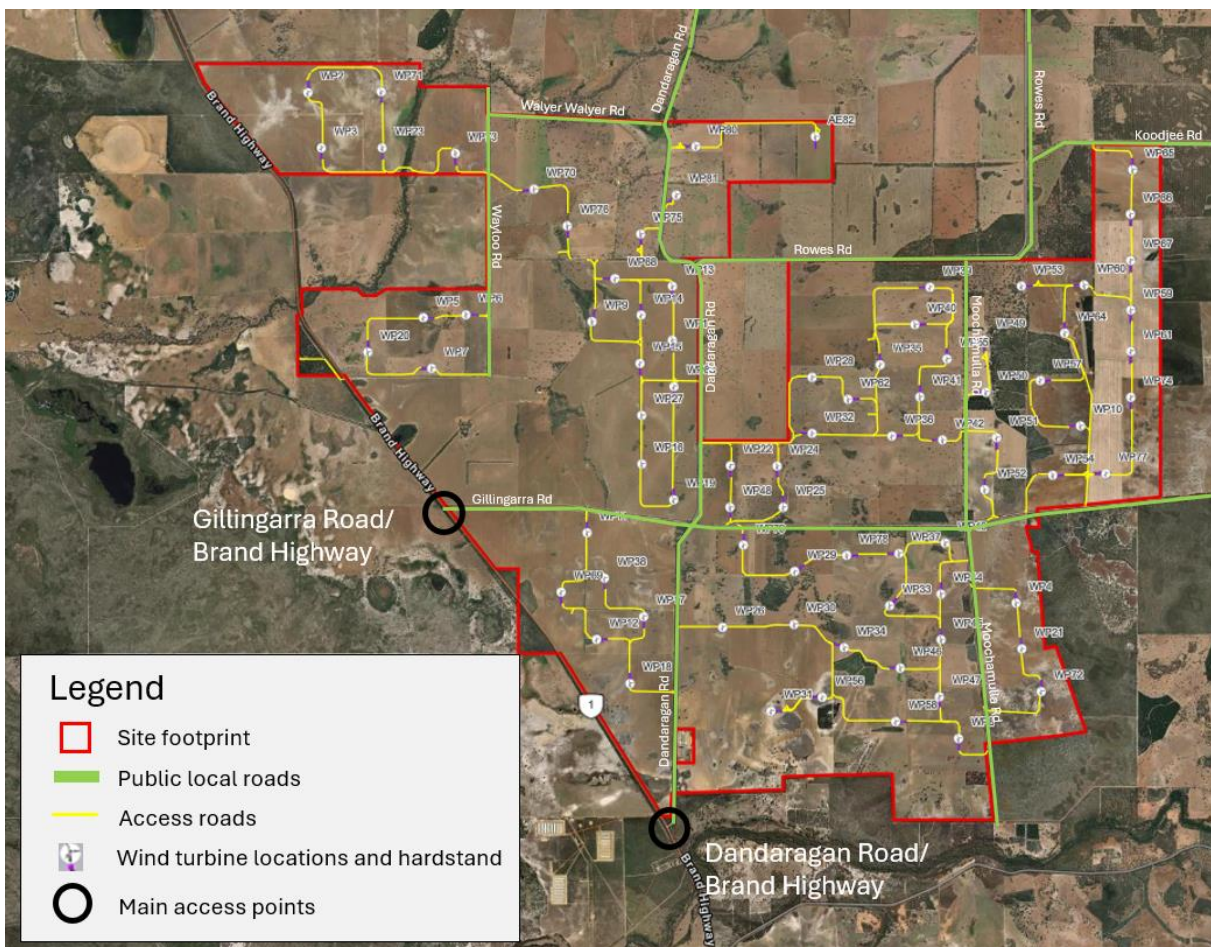


Figure 7-1: Site access

#### 7.1.1 Dandaragan Road

The test vehicle swept paths are shown below in Figure 7-2. From this assessment, it is identified that significant vegetation is impacted when accessing Dandaragan Road, from both the north and south. Furthermore, the southeast corner at Dandaragan Road would need to consider drainage infrastructure if upgraded (based on consultation with Main Roads Gascoyne).



Figure 7-2: Dandaragan Road/ Brand Highway swept path analysis

### 7.1.2 Gillingarra Road

The test vehicle swept paths are shown below in Figure 7-3. From this assessment, it is identified that significant vegetation is impacted when accessing Gillingarra Road from the south but is not the case when accessed from the north. From the BYDA search, the building on the south east corner is a fixed constraint, associated with power utilities. This is avoided in the swept path, including the fence.

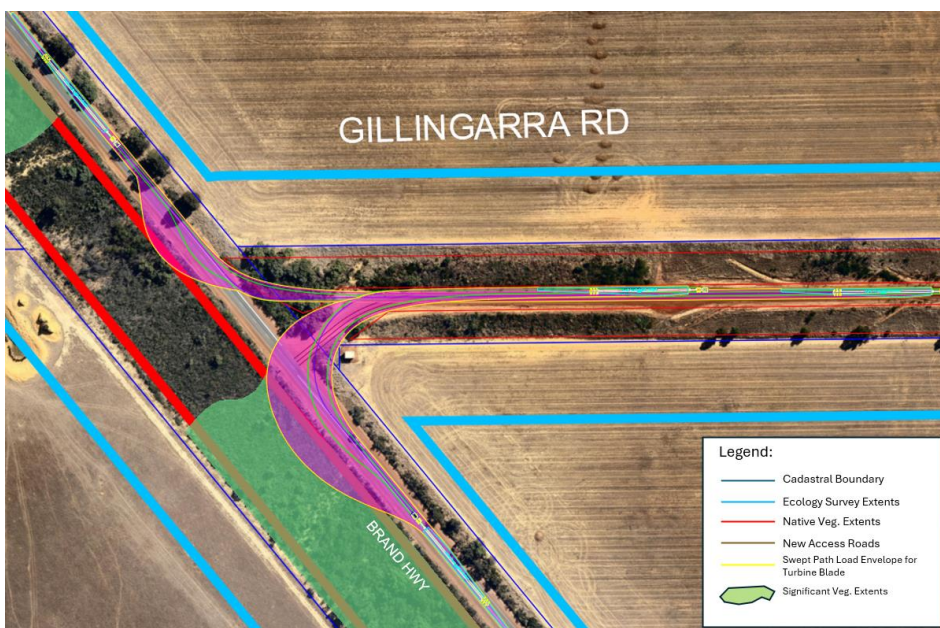


Figure 7-3: Gillingarra Road/ Brand Highway swept path analysis

### 7.1.3 Secondary access

Secondary accesses were also considered at a high level, as per Figure 7-4. The intent here was to highlight additional locations that could provide access to the project, or help support access for the primary access locations.

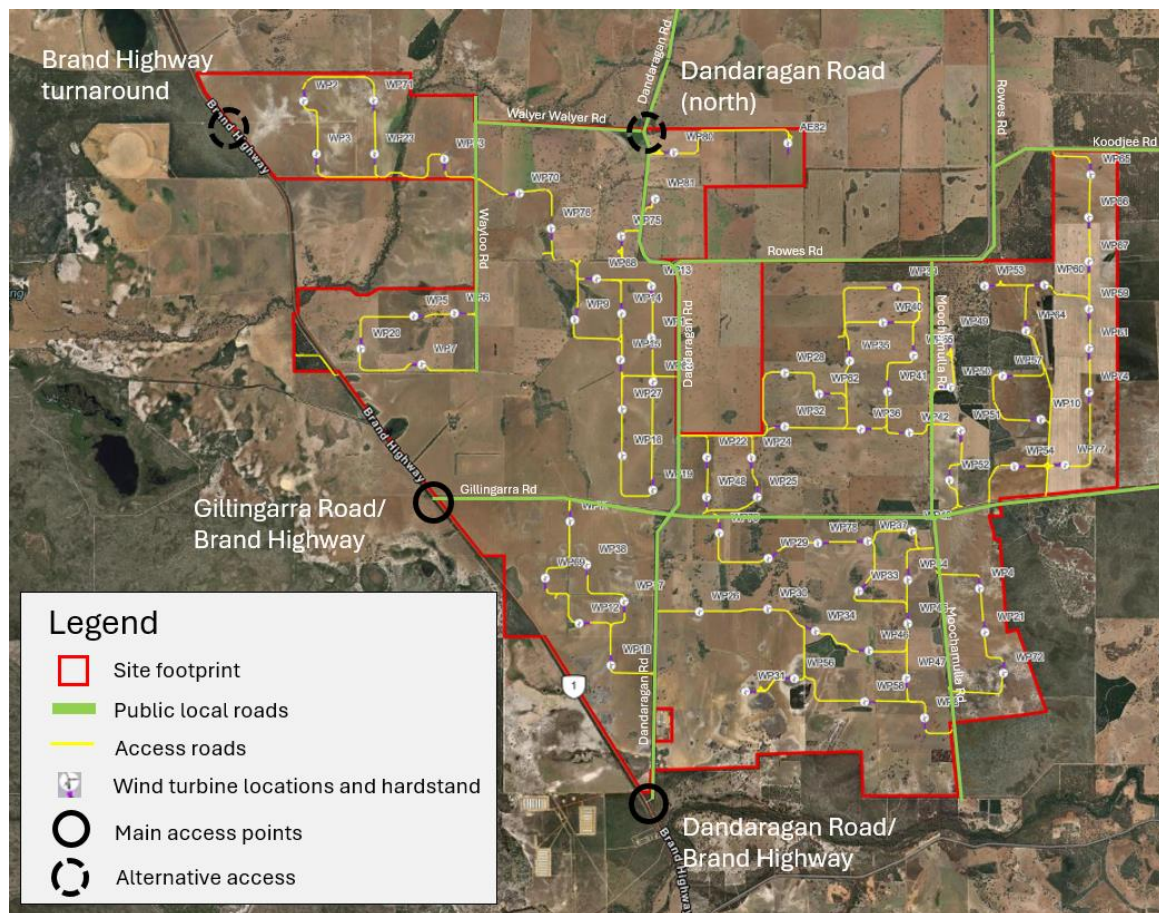


Figure 7-4: Alternative site access options

The secondary access are summarised below.

- Substation access on Brand Highway - A substation is proposed to be located north of Gillingarra Road and to the west of the Brand Highway. A proposed driveway connecting to the Brand Highway will provide access to the substation and satellite compound. Unlike the rest of the project site, this will not require facilitation of blade transportation, and so the most likely worst case vehicle for this location is associated with transformer transportation. A typical vehicle for this is a prime mover with platform trailer which has been tested below for a 190 tonne transformer (as advised) with a truck combination length of 44m. For conservativeness, a single point of articulation has been adopted for the vehicle (rather than two) as to accommodate for variations in trailer configurations and available transport operator equipment (refer to Appendix C for further details). See Figure 7-5 and Figure 7-6 for the swept paths analysis.
- Turnaround on Brand Highway - A turnaround facility further north as to allow vehicles travelling from the south to instead enter from the north was considered. This would minimise impacts to significant vegetation, if Gillingarra Road was selected as the primary access. This turn around facility could be located within the project site with the additional access off Brand Highway. This may also avoid the need for a bridge upgrade for internal roads in this area. See Figure 7-7 for the swept path analysis.

- Alternative points of entry - Accessing the site from the north via Dandaragan Road, either
  - Continuing north along Brand Highway and turning east on Cataby Road and then south onto Dandaragan Road. Equates to additional 70km of travel and likely introduces additional intersections which would require modifications to accommodate transportation of wind turbine components (e.g. Brand Highway/Cataby Road). This is not required to be investigated further as other more suitable locations are currently preferred (see primary and secondary above).
  - From Muchea, traveling along Great Northern Highway, turning west at Midlands Road, travelling through Moora and then onto Dandaragan Road. Equates to additional 110km of travel, and likely introduces additional intersections which would require modifications to accommodate transportation of wind turbine components, particularly at Moora. This is not required to be investigated further as other more suitable locations are currently preferred (see primary and secondary above).



Figure 7-5: Substation access/ Brand Highway swept path analysis (Prime mover from south)

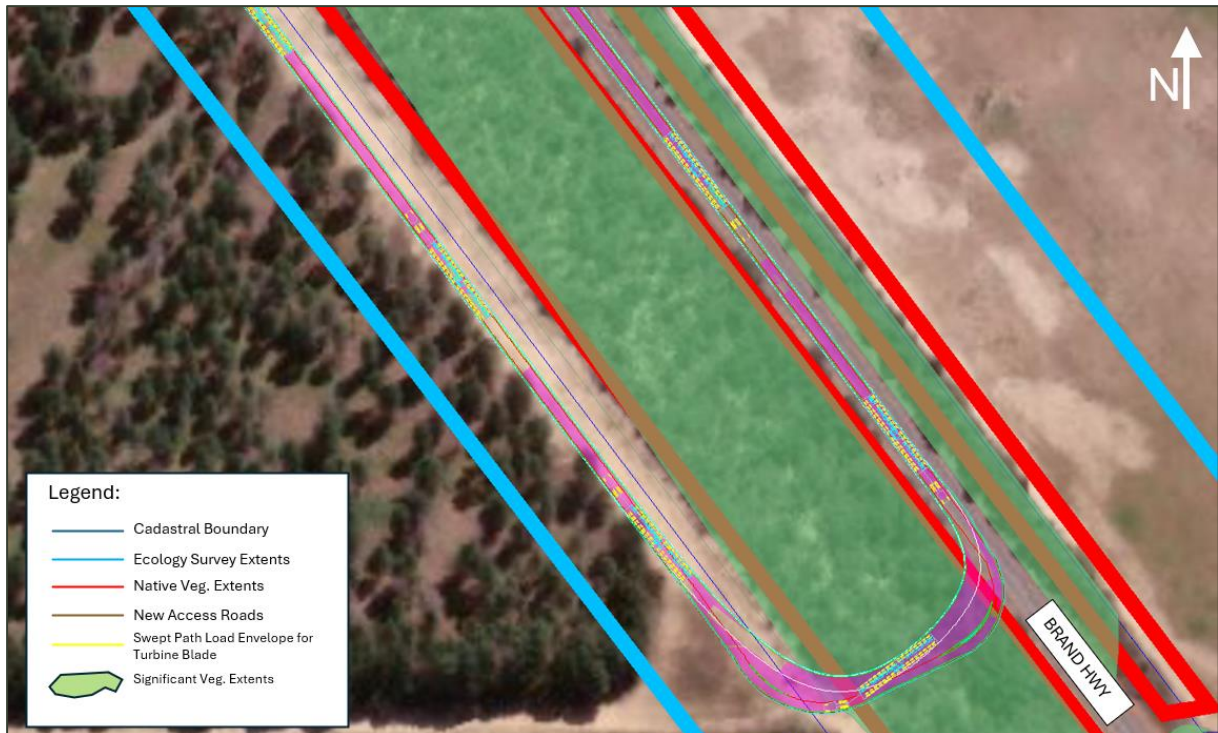


Figure 7-6: Substation access/ Brand Highway swept path analysis (Prime mover from north)



Figure 7-7: Turnaround/ Brand Highway swept path analysis

## 7.2 Internal roads

A preliminary review of the internal roads was also undertaken as to inform potential impacts with significant vegetation and services. Preliminary swept path checks were undertaken for the intersections of each of the public internal roads (see Figure 7-8), in addition to those intersections with the private access roads (specific to turbine access) where there may be an impact to significant vegetation.

The swept path analysis is included in Appendix C which outlines the spatial impacts and resultant conflict for transportation of wind turbine blades. A number of opportunities were identified for consideration, also documented in the above.

As part of the BYDA search, Dampier to Bunbury Gas Pipeline (DBNGP) was identified running north-south through the site, it has been noted in the updated internal roads layout (designed by others and received from Alinta Energy on 28<sup>th</sup> July 2025) shows a proposed access road alignment over the existing DBNGP. It should be noted that if the Project intends to build additional roads or access tracks over the top of the DBNGP then the authority will need to be contacted and the relevant engineering assessments and processes will need to be undertaken to ensure the safety and integrity of the pipeline.

It is noted that Telstra utilities run along some of the road reserves including Dandaragan Road. Western Power returns were also received along with the BYDA returns indicating that Western Power has electrical power assets in the area including overhead power lines running parallel to Brand Highway.

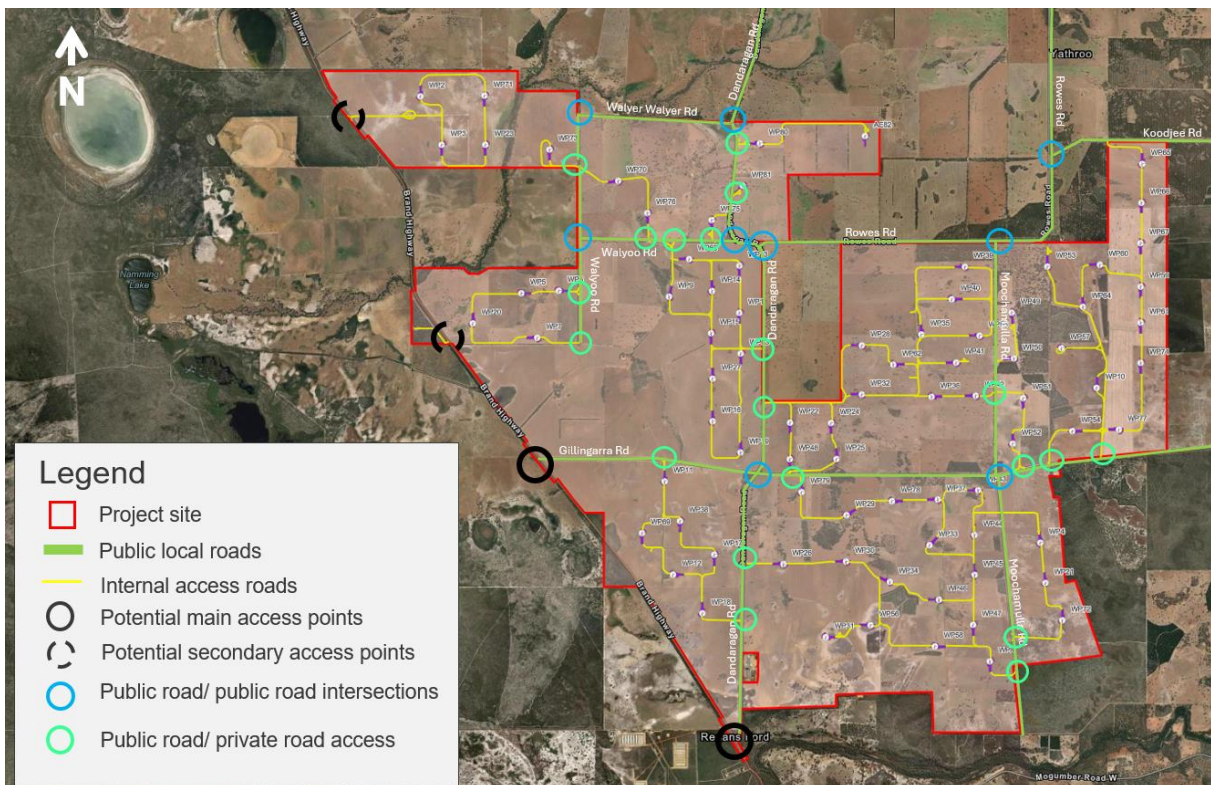


Figure 7-8: Internal swept path checks

## 8 Regulatory requirements

It is understood that the following is required for the approvals

- Following this preliminary assessment of the preferred routes, Main Roads (relevant regions and its Road and Traffic Engineering branch (RTE)) will need to provide approval of any required design considerations. The City of Greater Geraldton will also be required to be engaged for any required changes on Goulds Road and Rudds Gully Road. Furthermore, any other impacted asset owners (e.g. utilities) will also have to be engaged.

- Environmental and Heritage assessments and approvals where routes require vehicles to leave the existing road boundaries must be initiated well before transporting the goods to allow sufficient time for approvals to be granted
- Submission of the preferred route/s for a Mass Only Assessment by Heavy Vehicle Services (HVS) should be sought before committing to a preferred route to determine any potential constraints relating to the weight restrictions on bridges or other structures along the route. It is more than likely that most structures will require bridge surveillance as the loads are transported across. Once an OEM is confirmed, it is recommended this report and weights of components are sent to Main Roads HVS for assessment.
- Routes (along entire length) will need to be checked with Western Power for likely travel height restrictions.
- An OSOM Traffic Management Plan (TMP) must be prepared and approved by HVS prior to the transportation of any oversize over mass components (OSOM) such as the blades. This would be done in consultation with Main Roads and affected Shires. To minimise the impacts of the blade delivery, the TMP would set out strategies and processes to maintain the safety and performance of the local road networks (establish traffic wardens and processes etc – not part of current study). The TMP would include commentary on escort vehicles and temporary restrictions required to manage conflicts, so all intersections are clear from parking and oncoming traffic. If approval is not granted, a revision and resubmission will be required. The TMP will not be approved until the detailed route survey is completed. The detailed route survey is typically undertaken by the transport operator as to confirm that the modifications made to the transport network facilitate the OSOM movements.
- A Transport Impact Assessment considering broader impacts of construction staff and traffic (beyond just the transportation of specialised wind turbine equipment) will be required for development approval (separate from this current study). This route assessment can be attached to this, with a summary inserted into the main document.

## 9 Conclusions and recommendations

A route assessment for transportation of wind turbine equipment from AMC Port and Geraldton Port to site has been undertaken. The overarching intent of the route assessment is to provide the Proponent with an assessment of viable routes that could affect project costs and viability, in addition to helping inform the extent of early roadworks (including vegetation clearing – refer to appendices for estimated quantities) that may necessitate approvals from asset owners and authorities. Furthermore, the study has conducted a review of site access and key internal roads as to identify potential constraints for further consideration.

Based on the desktop analysis conducted, the preferred routes for transportation of wind turbine components are as per below:

- AMC Port to site:
  - Preferred Route 1 (blades only): Cockburn Road, Rockingham Road, Mandurah Road, Kwinana Freeway, Roe Highway and Tonkin Highway, Brand Highway
  - Preferred Route 2 (all other components): Cockburn Road, Rockingham Road, Thomas Road and Tonkin Highway, Brand Highway
    - High haulage sub-route 1 for tower components: Exit (from above) on Tonkin Highway on-ramp (contraflow) onto Abernethy Road, Great Eastern Highway Bypass, Stirling Crescent, Bushmead Road, Military Road, Roe Highway, Great Northern Highway, Tonkin

Highway/Brand Highway interchange (contraflow), Brand Highway. Note also alternative from Tonkin onto Aberneth Road (sub-route 2) however less likely to accommodate height requirements).

- Port of Geraldton to site:
  - Preferred Route (all components): Ian Bogle Road, John Willcock Link, Geraldton Mount Magnet Road, Goulds Road, Rudds Gully Road, Brand Highway

It is recommended that further analyses are undertaken to ensure that the optimal route is adopted for the transportation of the heavy vehicles. Further analysis and development of the following is recommended as per below. Note the selection of a preferred wind turbine and associated specifications is subject to change and should be considered as part of the outcomes of this study and below actions.

- Driving the route to check for any clearance or other obvious issues
- Vertical geometry checks (note high level checks undertaken to date only via desktop review)
- Send routes for mass checks by HVS to determine in weight restrictive elements, adopting the 190 tonne transformer combination (44m long prime mover and platform trailer) for the worst case.
- Detailed swept path analyses to determine cost of temporary works (e.g. quantities for hardstands)
- Traffic impact considerations
- A timeline for approvals and design requirements
- Risk analyses of flooding and fire events
- Whilst the proposed routes currently align with that recommended from Main Roads HVS (and other consulted stakeholders), the proposed routes may change subject to approvals from authorities.
- Note construction vehicles are outside of scope but need to be established further as part of the Traffic Impact Assessment (TIA). These additional components will also require further consideration, however are unlikely to exceed that of the turbine components (i.e. length and overhead height).

The site access review has established the spatial requirements and resultant impacts for the two potential main accesses to the site, at Brand Highway/Dandaragan Road and Brand Highway/Gillingarra Road. In addition, the key intersections in the internal road layout have been reviewed. Further consideration is recommended as per below.

- Potential shared use of Dandaragan Road access subject to engagement with adjacent wind farm proponent.
- Selection for Gillingarra Road for primary access as to limit impact to significant vegetation (when compared with Dandaragan Road)
- Potential turn-around facility north of Gillingarra Road (if Gillingarra Road is selected as the primary access) so that turbine blades enter from the north, which does not impact significant vegetation.
- Adjusting internal access road alignments to avoid conflict with significant vegetation.
- Confirmation of port of use, which may influence selection of the primary access and above points.

Shapefiles of the preferred routes and all swept path tests are provided with this report.

## 10 Limitations

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Main Roads WA overhead structure data was utilised from the Main Roads HVS Maps portal online and Maximum Load Height adopted. For structures not detailed, this information was supplied by Main roads HVS team and 300mm deducted to provided clearance requirements.

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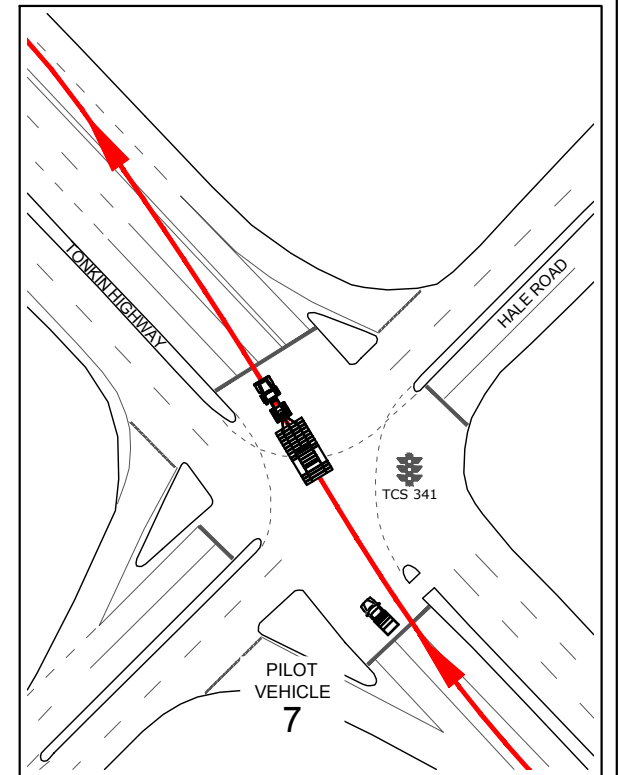
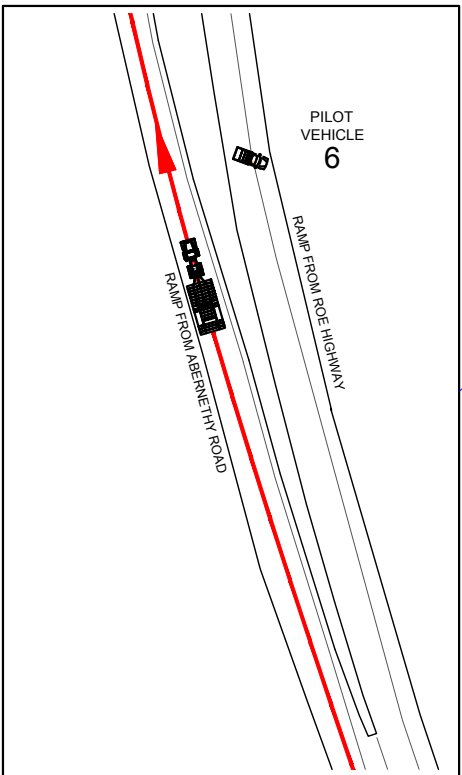
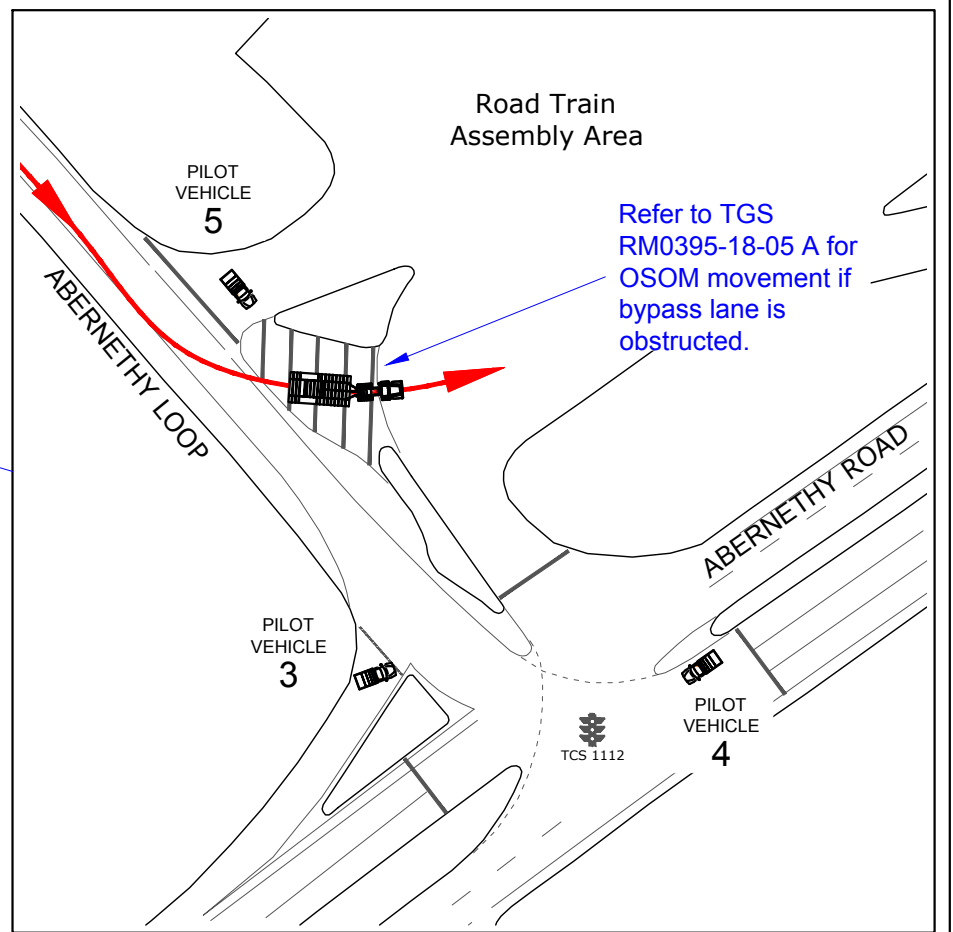
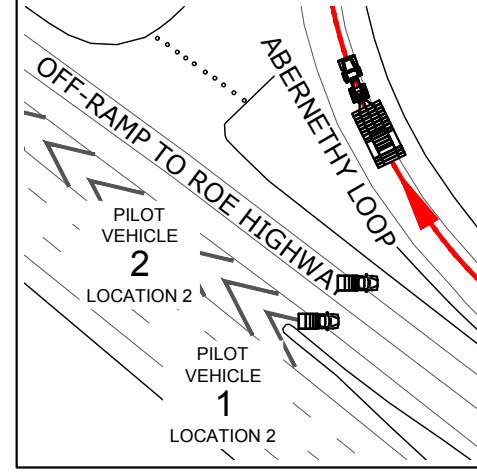
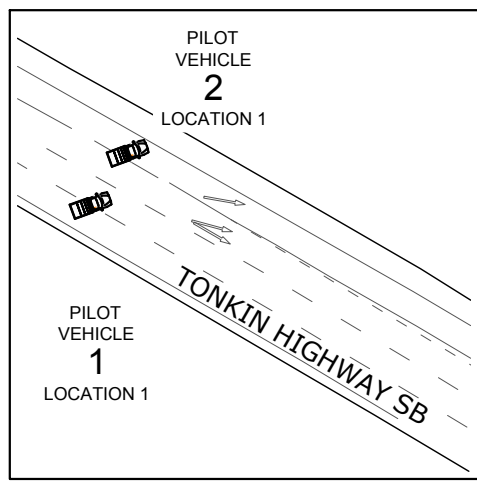
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## **Appendix A – Contraflow movement diagram at Tonkin Highway**



**NOTES:**

- Minimum 7 Pilot vehicles required to facilitate contra flow movement.
- Road Network Operations Centre shall be contacted (138 111) prior to commencing Oversize movement and at the conclusion of the contra flow movement.
- Direct UHF radio communication is to be maintained between Pilot vehicles, Oversize vehicle(s) and Traffic Escort vehicle (if applicable) at all times.
- Pilot vehicles 1, 2, 3, 4, 5 & 6 shall move to the locations shown (Pilot vehicles 1 & 2 to Location 1) and stop all traffic prior to the Oversize vehicle(s) reaching the Hale Road intersection:
  - Pilot vehicles 1 & 2 shall stop all traffic southbound on Tonkin Highway;
  - Pilot vehicles 3 & 4 shall stop traffic turning into Abernethy Loop from Abernethy Road;
  - Pilot vehicle 5 shall stop trucks exiting the Road Train assembly Area onto Abernethy Loop;
  - Pilot vehicle 6 shall stop all traffic from the ramp onto Tonkin Hwy southbound from Roe Highway;
  - Pilot vehicle 7 shall shadow the Oversize vehicle(s) to control trailing traffic during the Oversize vehicle manoeuvre to the contra flow lane;
  - Should the bypass through the Road Train Assembly Area be obstructed, Pilots 3 & 4 shall relocate to the locations shown on TGS RM0395-18-05 A, and the Oversize vehicle(s) shall follow the path shown on TGS RM0395-18-05 A.
- Oversize vehicle(s) shall not enter the Hale Road intersection until notified that all traffic is stopped and the intersection, Tonkin Highway and Abernethy Loop lanes are clear of traffic.
- Once the Oversize vehicle(s) have passed through the Hale Road intersection and onto ramp from Abernethy Road, Pilot vehicles 1 & 2 shall proceed to Location 2, then stop traffic on the off-ramp to Roe Hwy until the Heavy Vehicle(s) have progressed into Abernethy Loop.
- Pilot vehicle 2 shall hold traffic on the on-ramp from Roe Highway until the Heavy Vehicle(s) have progressed onto the on-ramp from Abernethy Loop, then shall release traffic.
- Once the Oversize vehicle(s) enter the Road Train Assembly Area the Pilot vehicles can release traffic and continue with duties as required.

**TRAFFIC FORCE**

P: 1300 256 000  
 E info@trafficforce.com.au  
 W www.trafficforce.com.au

Client:	MRWA HEAVY VEHICLE SERVICES
Location:	TONKIN HIGHWAY NORTHBOUND INTO ABERNETHY LOOP, FORRESTFIELD
Title:	OVERSIZE VEHICLE MOVEMENT NORTHBOUND CONTRA FLOW ROUTE HALE ROAD TO ABERNETHY ROAD
Posted Speed:	80 kph
Temporary Speed:	N/A

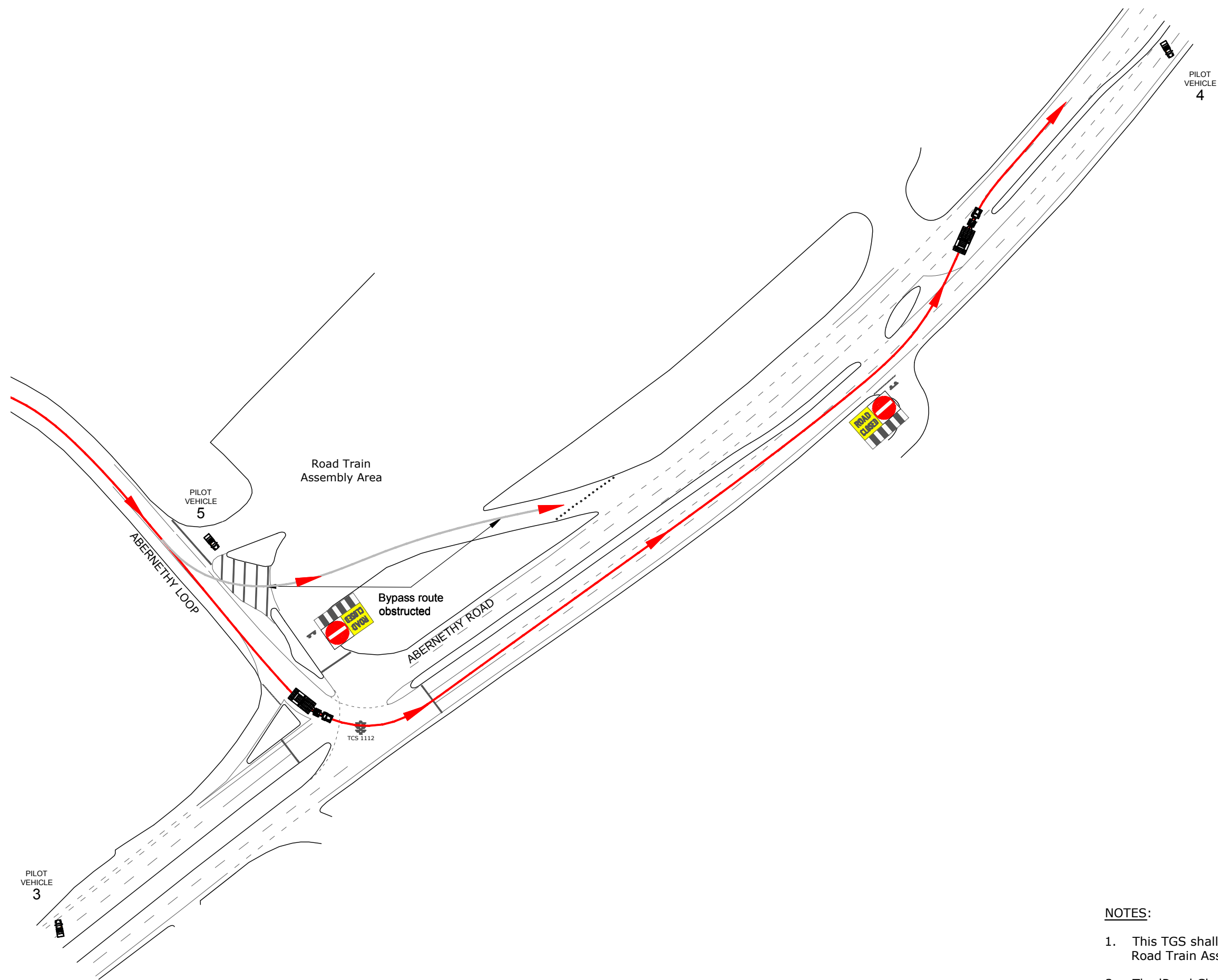
**LEGEND**

	Contra flow path
	Signalised intersection
	Pilot vehicle
	Oversize vehicle

**DISCLAIMER**  
 This TGS is intended for use only with works managed by Main Roads WA Heavy Vehicle Services and its authorised representatives. Traffic Force is not responsible for misuse and/or alterations which are not authorised by Traffic Force.

TGS No.:	RM0395-18-05	Revision	F	Paper Size	A3
Date	27 MAY 2020	Scale	Not to Scale		
Designed by:	DALLAS MILLWARD AUS-AWTM-18-2352-02				
Reviewed by:	SHAUNA ILEY AUS-AWTM-18-5651-01				

NORTH



**NOTES:**

1. This TGS shall be used where the bypass route through the Abernethy Road Train Assembly Area is obstructed.
2. The 'Road Closed' signage shall be implemented and Pilot vehicles 3 & 4 shall move to the locations shown and stop all traffic prior to the Oversize vehicle(s) reaching the off-ramp to Roe Highway:
  - Pilot vehicle 3 shall stop traffic on Abernethy Road eastbound;
  - Pilot vehicle 4 shall stop traffic on Abernethy Road westbound.
3. Once the Oversize vehicle(s) clear the contra flow route and return to the normal lane of travel the Pilot vehicles can release traffic and continue with duties as required.

**TRAFFIC FORCE**  
 P: 1300 256 000  
 E info@trafficforce.com.au  
 W www.trafficforce.com.au

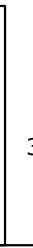
Client:	MRWA HEAVY VEHICLE SERVICES
Location:	TONKIN HIGHWAY NORTHBOUND INTO ABERNETHY LOOP, FORRESTFIELD
Title:	OVERSIZE VEHICLE MOVEMENT NORTHBOUND CONTRA FLOW ROUTE HALE ROAD TO ABERNETHY ROAD ASSEMBLY AREA BYPASS SCHEME
Posted Speed:	80 kph
Temporary Speed:	N/A

**LEGEND**

	Contra flow path
	Signalised intersection
	Pilot vehicle
	Oversize vehicle

**DISCLAIMER**  
 This TGS is intended for use only with works managed by Main Roads WA Heavy Vehicle Services and its authorised representatives. Traffic Force is not responsible for misuse and/or alterations which are not authorised by Traffic Force.

TGS No.:	RM0395-18-05 A	Revision	F	Paper Size	A3
Date	27 MAY 2020	Scale	Not to Scale		
Designed by:	DALLAS MILLWARD AUS-AWTM-18-2352-02				
Reviewed by:	SHAUNA ILEY AUS-AWTM-18-5651-01				



## **Appendix B – Route assessment review**

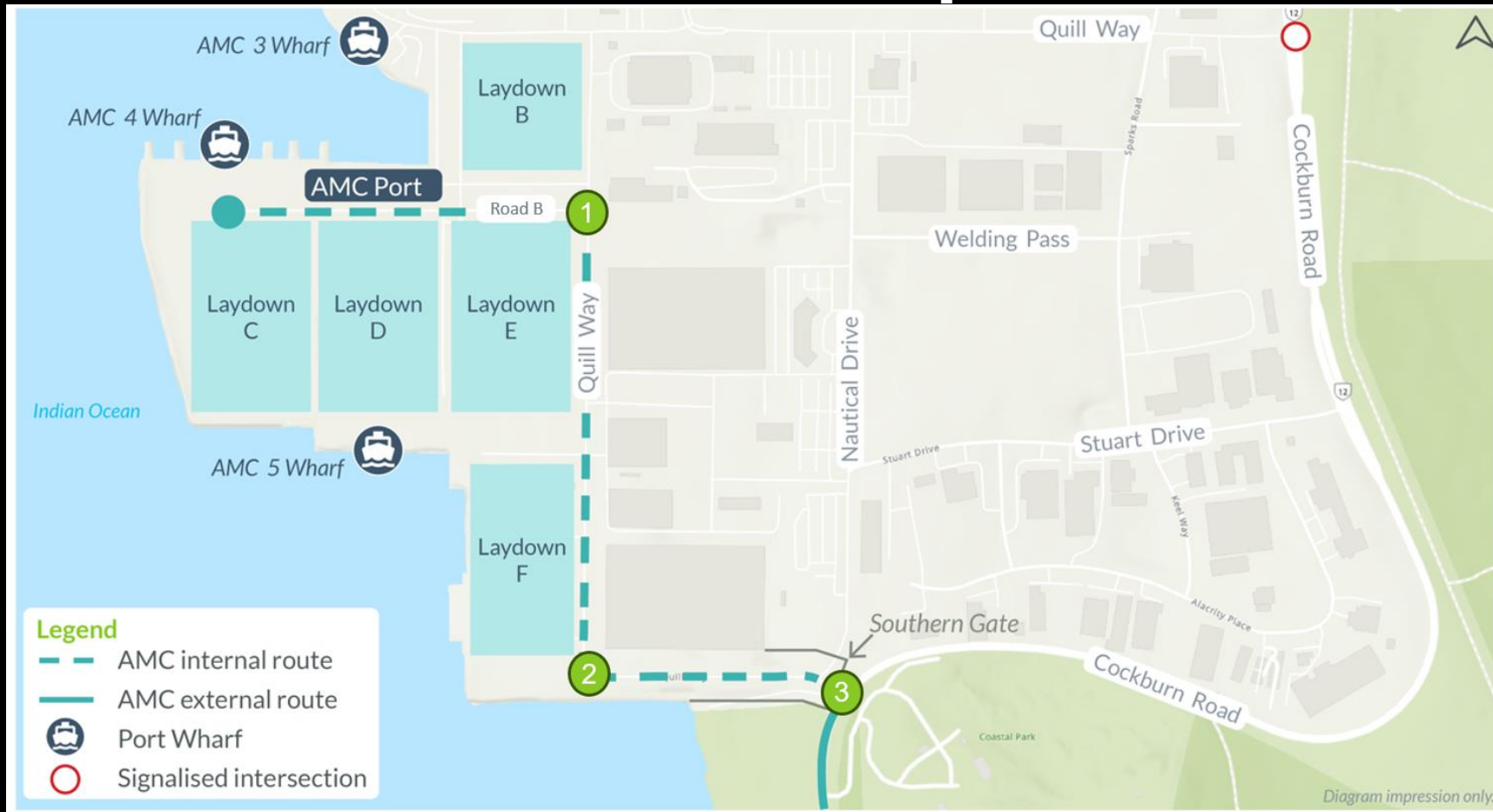
# Route Assessment Review

## Notes:

- The purposes of this review is to provide high-level insight of potential conflicts with the design vehicle as to inform the initial stages of the Project
- Identified conflicts should be verified on-site. This current review is a desktop study only (and subject to change based on any changes on-site).
- No detailed vertical geometry checks (e.g. no survey data reviewed).
- Further detailed swept path analyses required to determine cost of temporary works (e.g. quantities for hardstands)
- Swept paths based on AutoTURN software, noting other software applications may produce a different swept path profile. Furthermore, swept paths may vary based on variations in preferences across OEM specifications and transport operator equipment/methodology.
- Impacted vegetation is measured at a high-level only against the swept path profile and aerial imagery, with measurement encompassing the area of each indicated polygon. This quantity is subject to change and site investigations, and so should only be used for purposes of general quantification).
- Clearing requirements for impacted vegetation may vary if located within swept path of blade over sail (i.e. blade overhang which is approx. 1.8m above ground), or if under truck wheel path. Trimming rather than complete clearing may be an option for blade over sail (subject to further investigations).

AMC Port to Site

# AMC Map



# 1. Road B / Quill Way



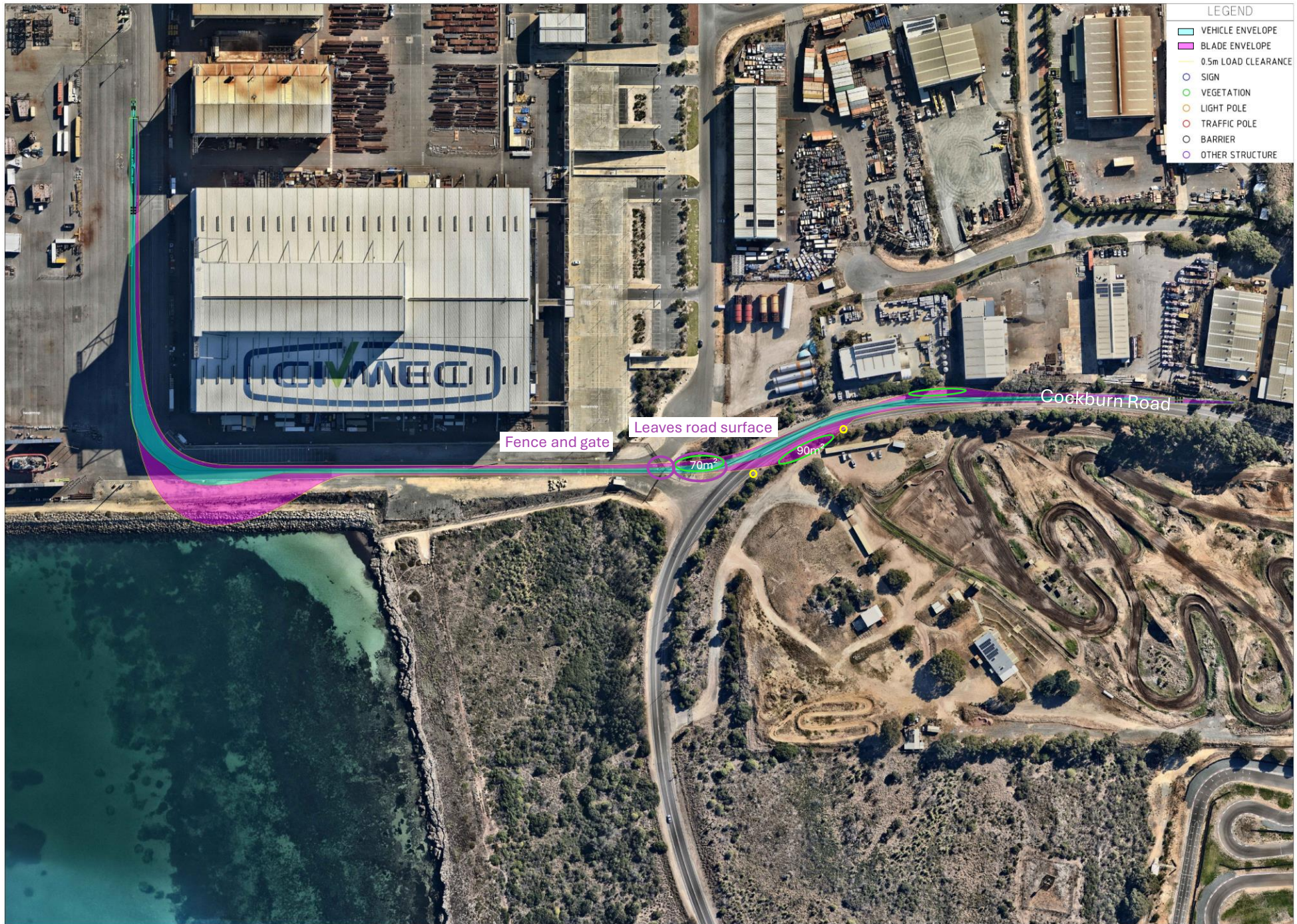
# 2. Quill Way / South End Rd



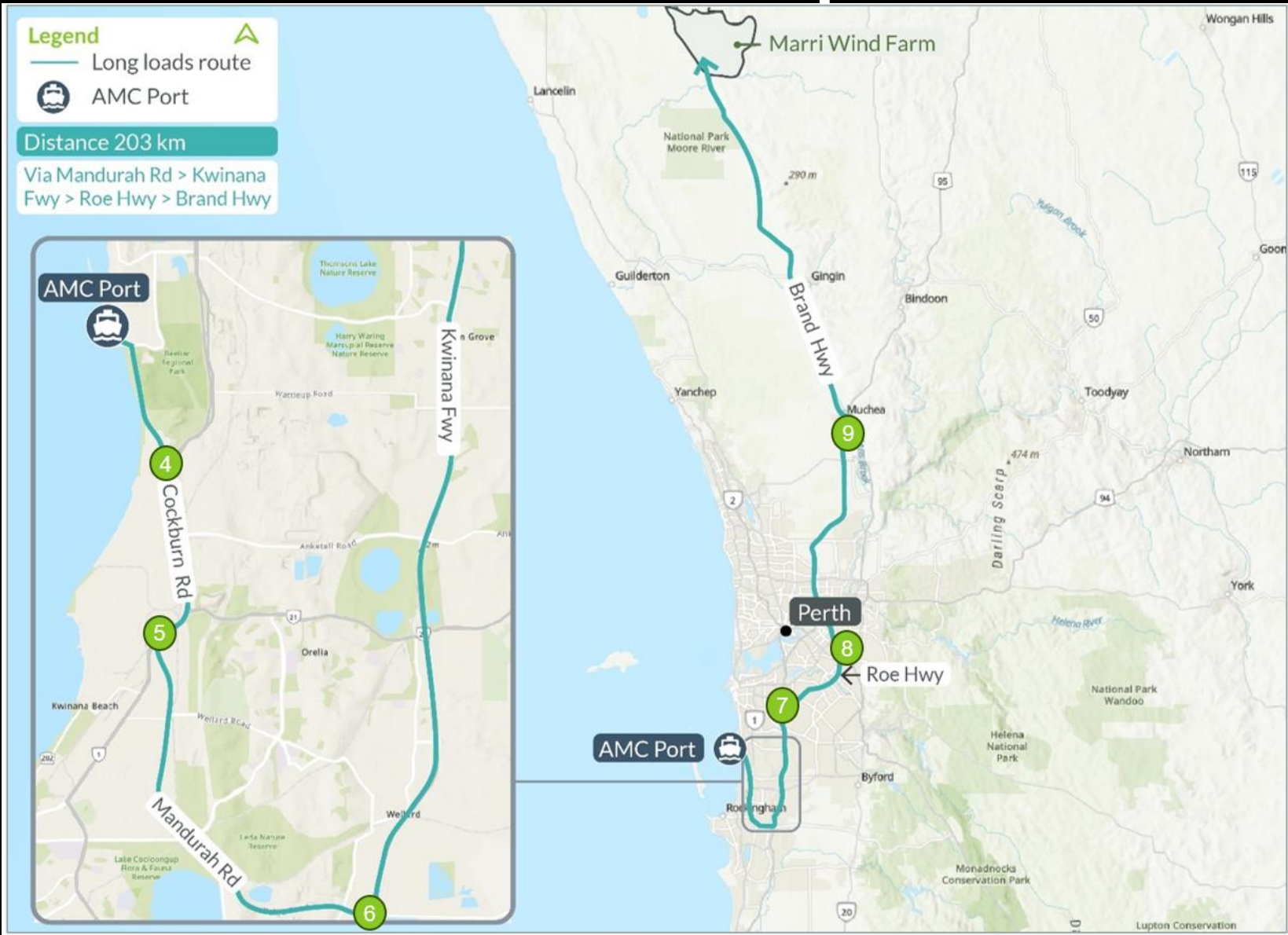
# 3. Cockburn Rd



# 2 & 3. Quill Way/ Cockburn Rd – Reverse



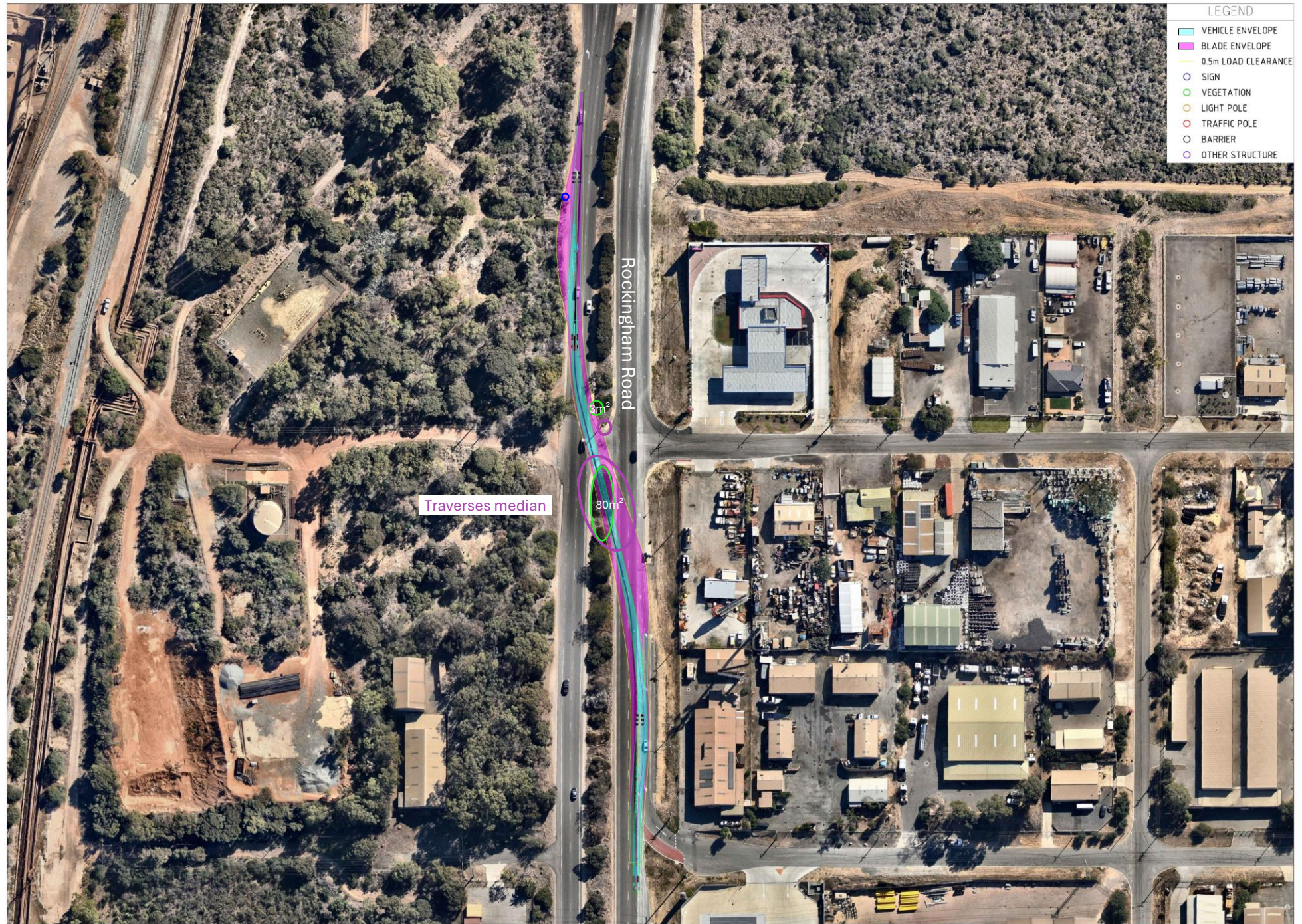
# Route Map



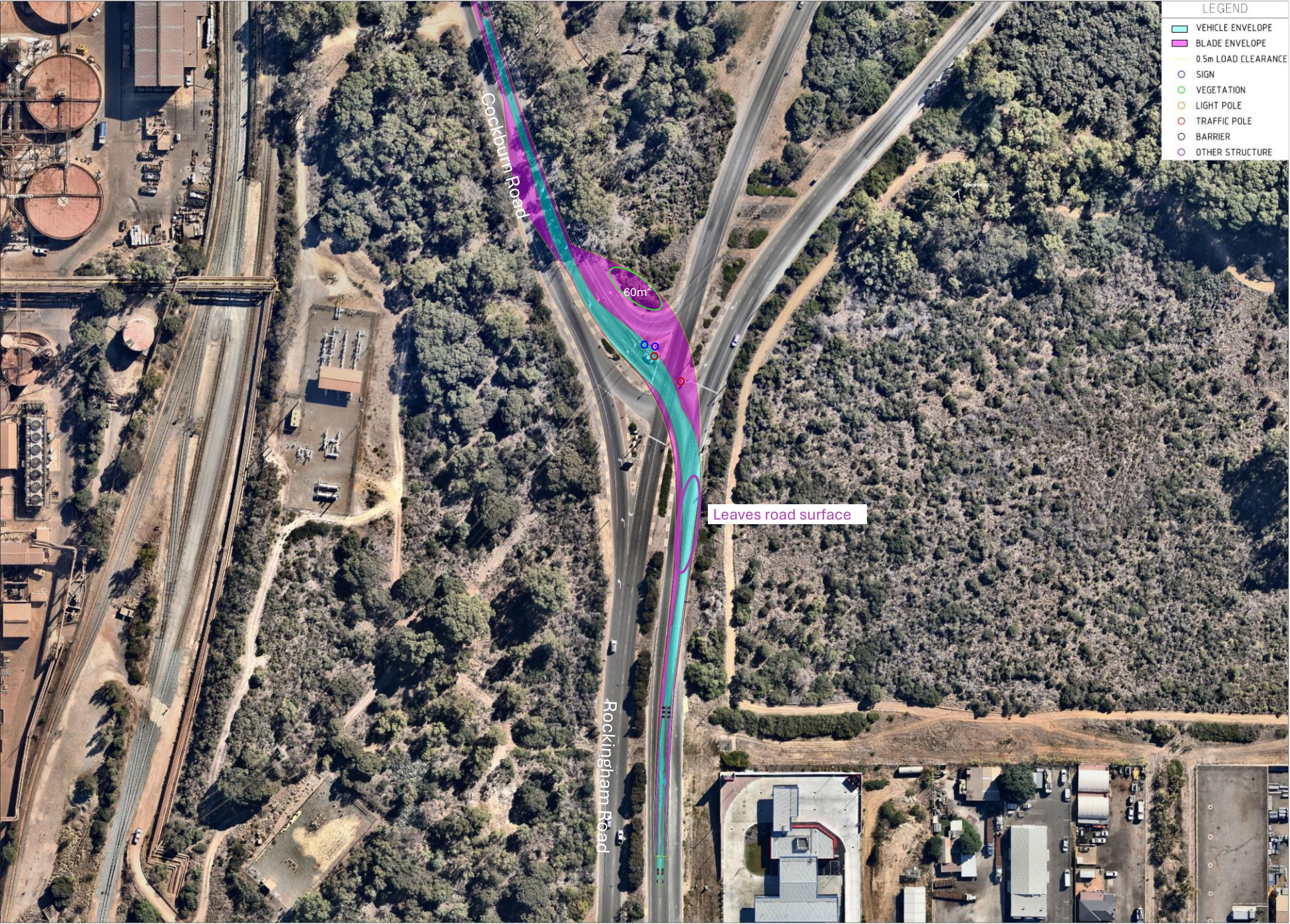
# 4. Cockburn / Rockingham Rd – Option 1



# 4. Rockingham Rd



# 4. Cockburn / Rockingham Rd – Option 2



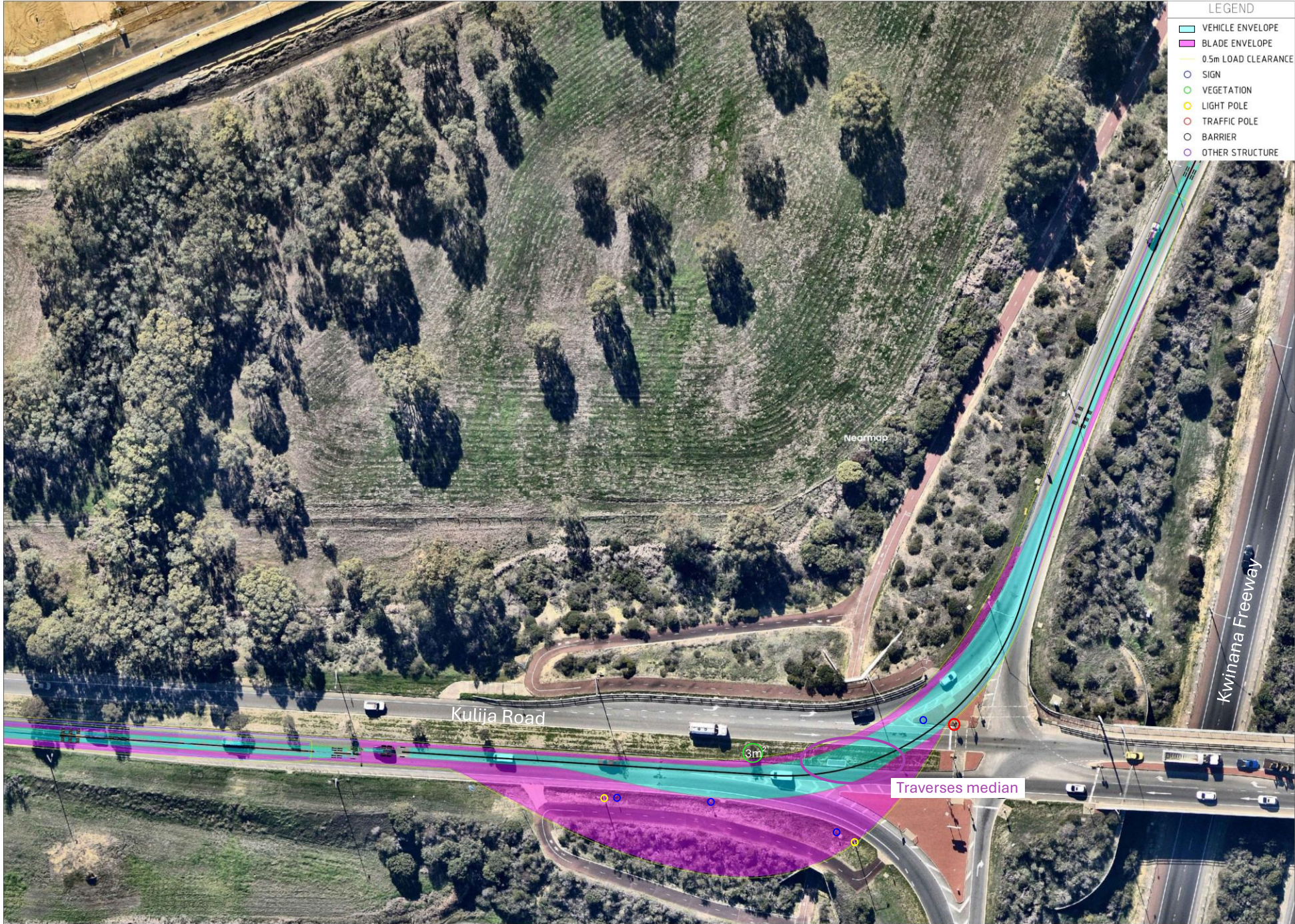
# 5. Rockingham Rd / Mandurah



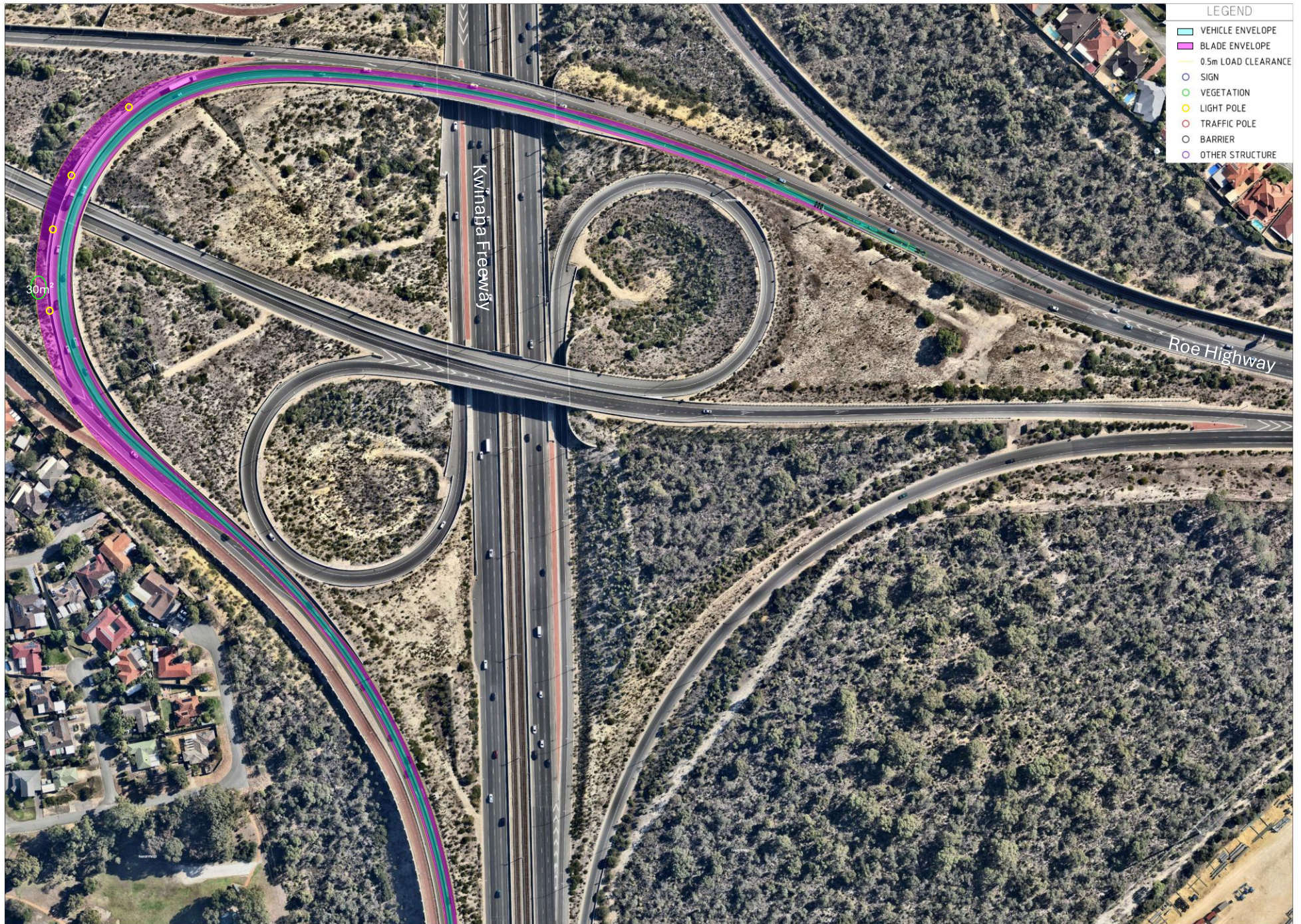
# 6. Kulija Road



# 7. Kulija Road / Kwinana Fwy



# 8. Kwinana Fwy / Roe Hwy



# 9. Roe Hwy / Tonkin Hwy

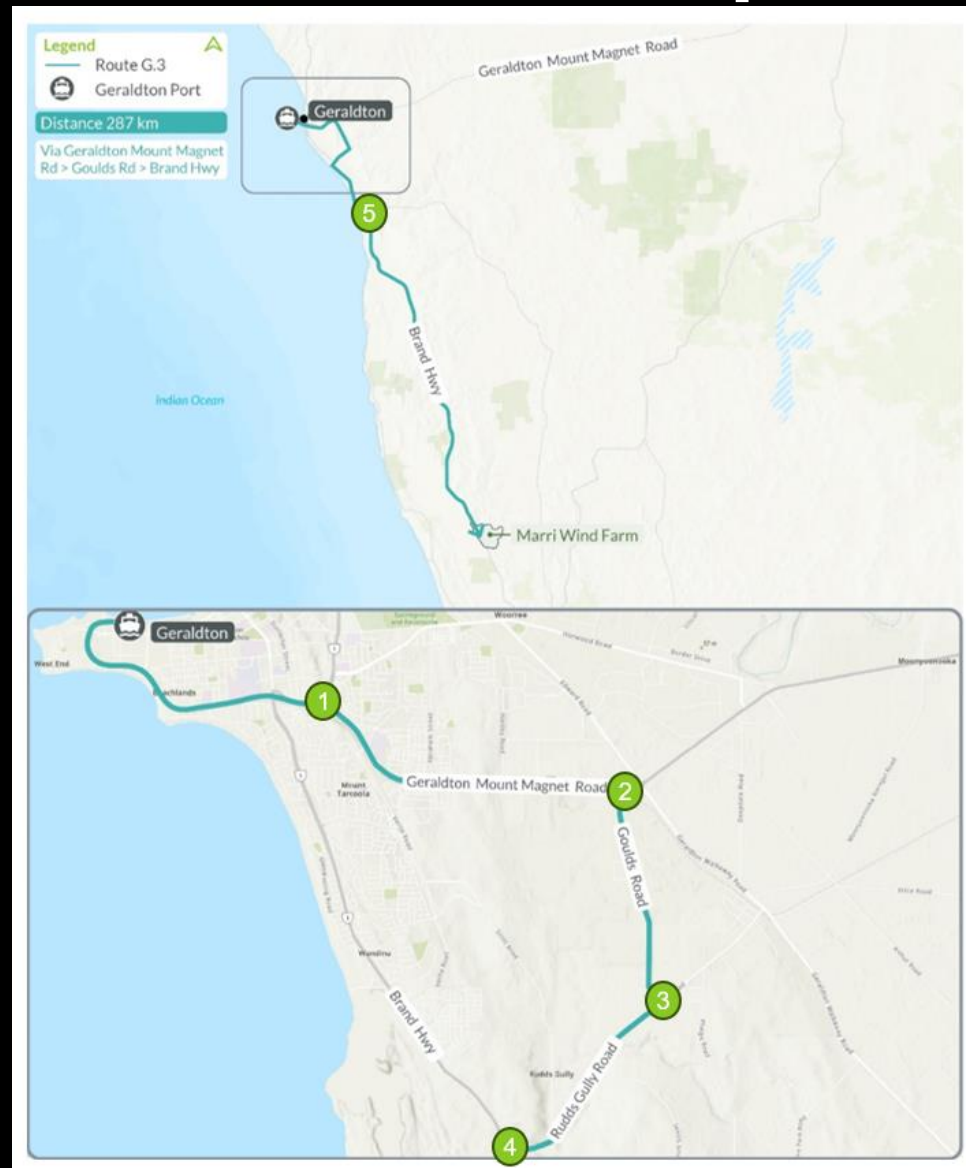


# 10. Tonkin Hwy / Brand Hwy

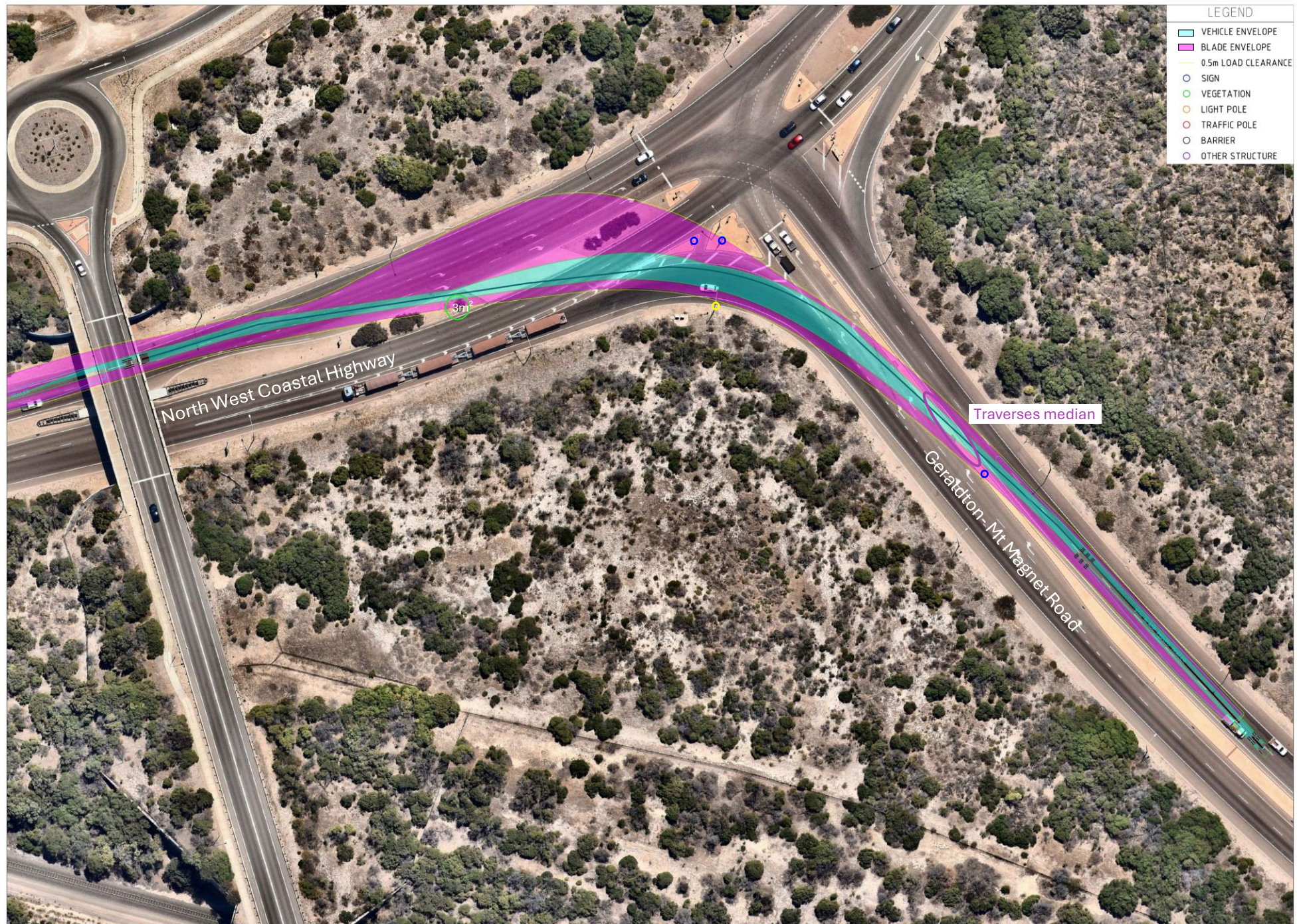


# Geraldton Port to Site

# Route Map



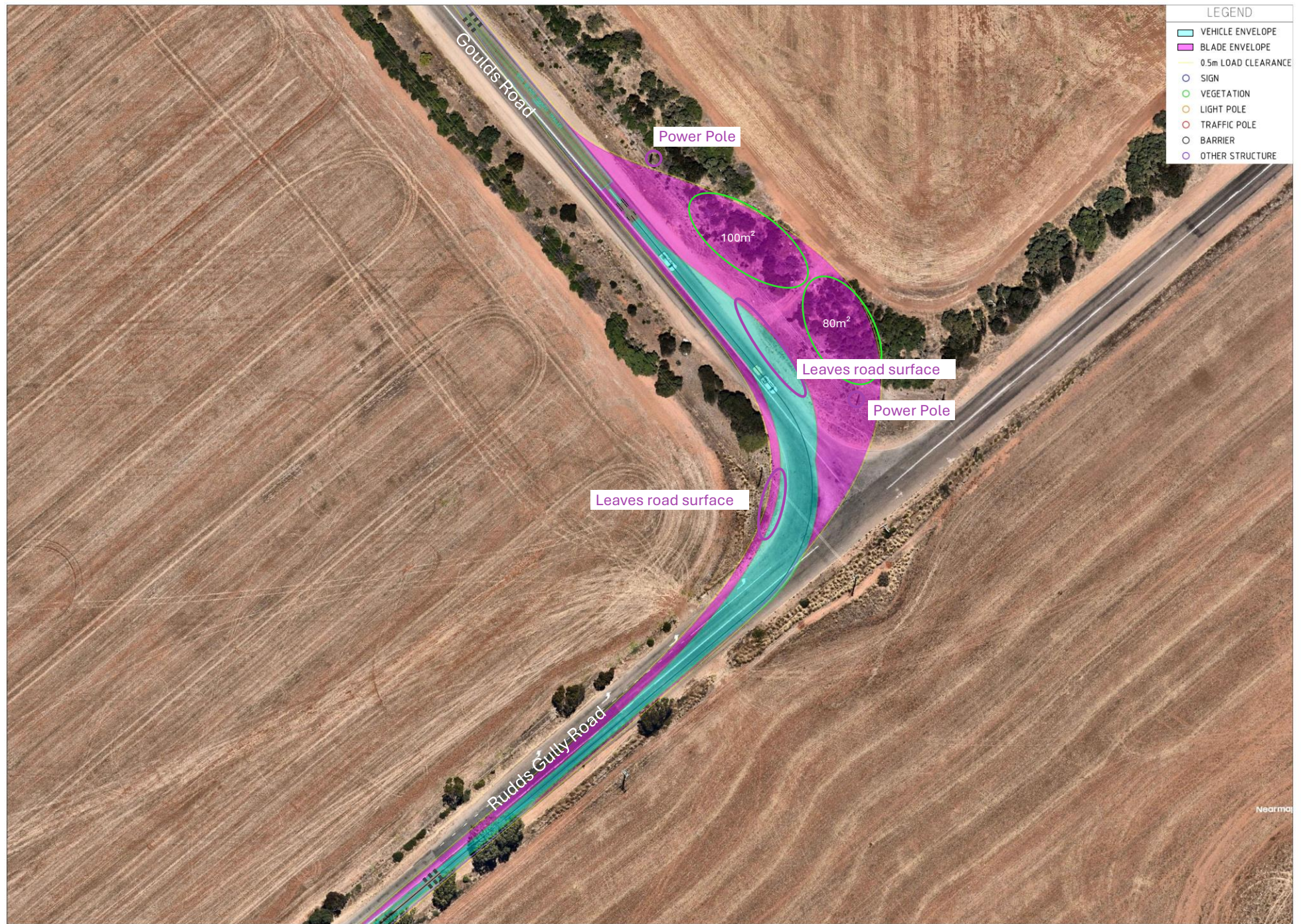
# 1. North West Coastal Highway / Geraldton- Mt Magnet Road



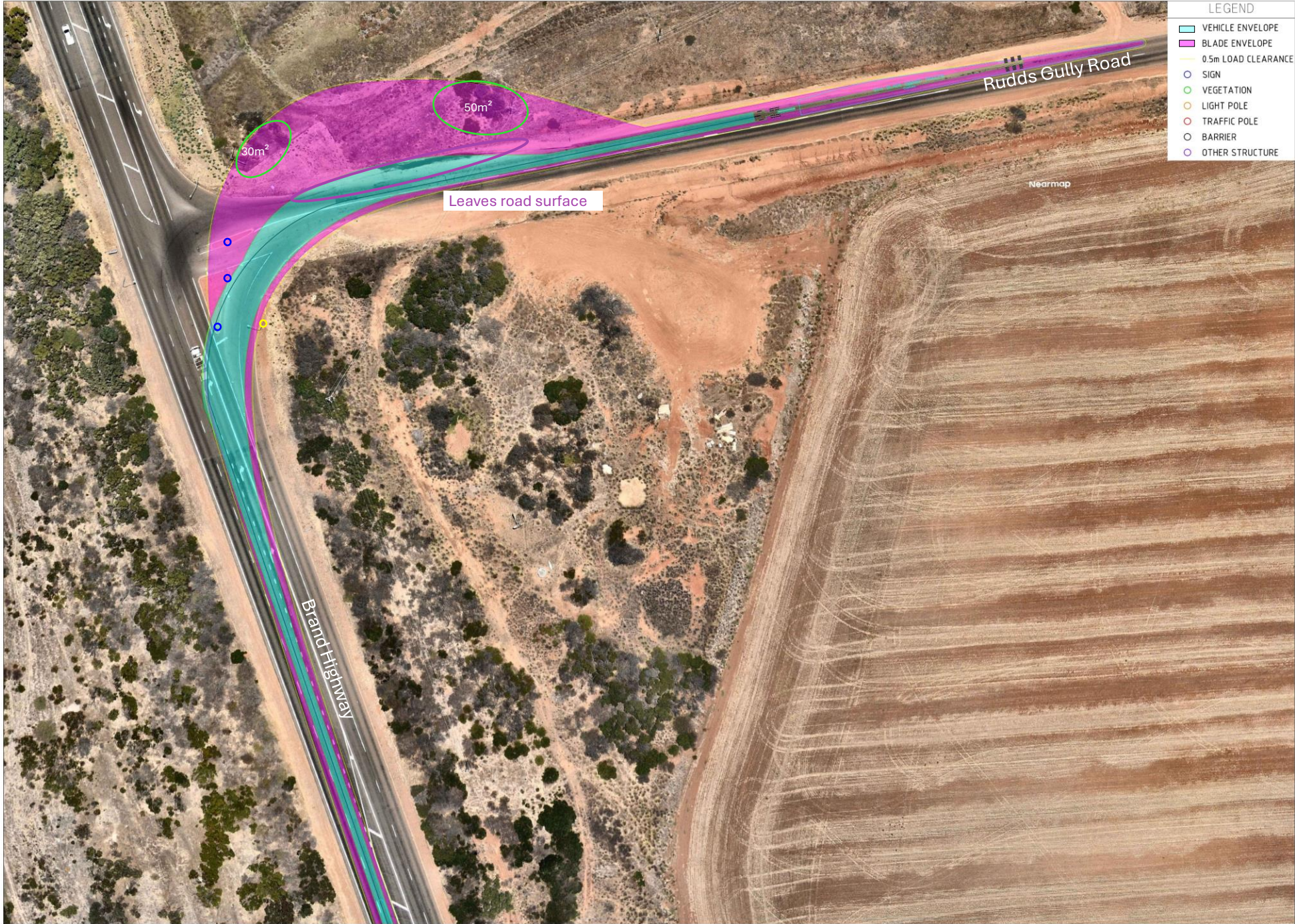
## 2. Geraldton- Mt Magnet Road / Goulds Road



### 3. Goulds Road / Rudds Gully Road



# 4. Rudds Gully Rd / Brand Hwy



# 5. Brand Hwy / Midlands Rd – Option 1



# 5. Brand Hwy / Midlands Rd – Option 2



## **Appendix C – Site access and internal roads review**

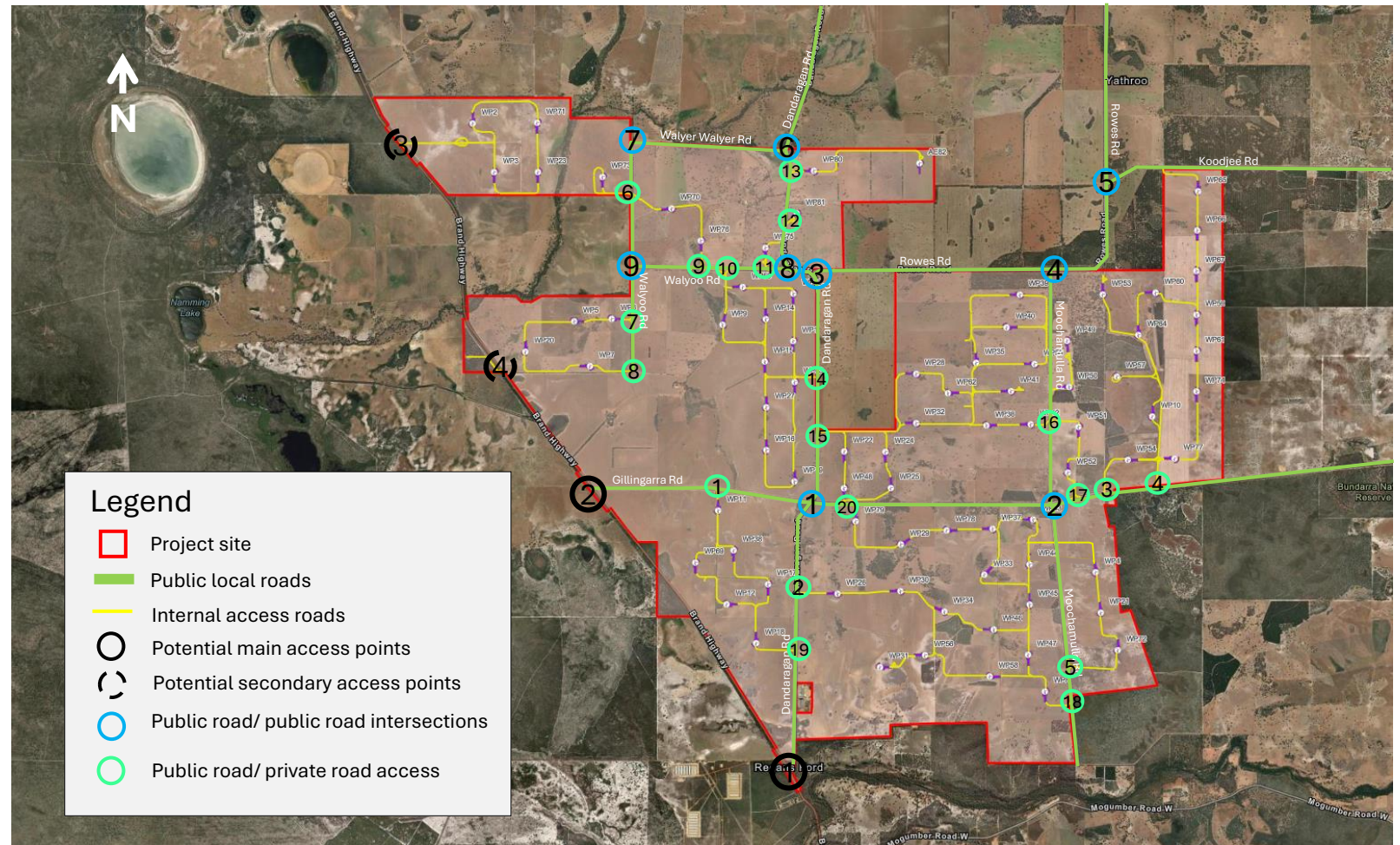
See next TIS Appendix B

# Appendix B – Site Access Review

# Site Access Review

## Notes

- The purposes of this review is to provide high-level insight of potential conflicts with the design vehicle as to inform the initial stages of the Project. The conducted swept path tests do not cover every possible turn and scenario at the site, and were rather selected based on interaction with public roads and connecting private access roads.
- Swept paths based on AutoTURN software, noting other software applications may produce a different swept path profile. Furthermore, swept paths may vary based on variations in preferences across OEM specifications and transport operator equipment/methodology.
- Identified conflicts should be verified on-site. This current review is a desktop study only (and subject to change based on any changes on-site).
- No vertical geometry checks (e.g. no survey data reviewed).
- Modelled vehicles are summarised in following slide.



# Test vehicles

## Turbine Blade

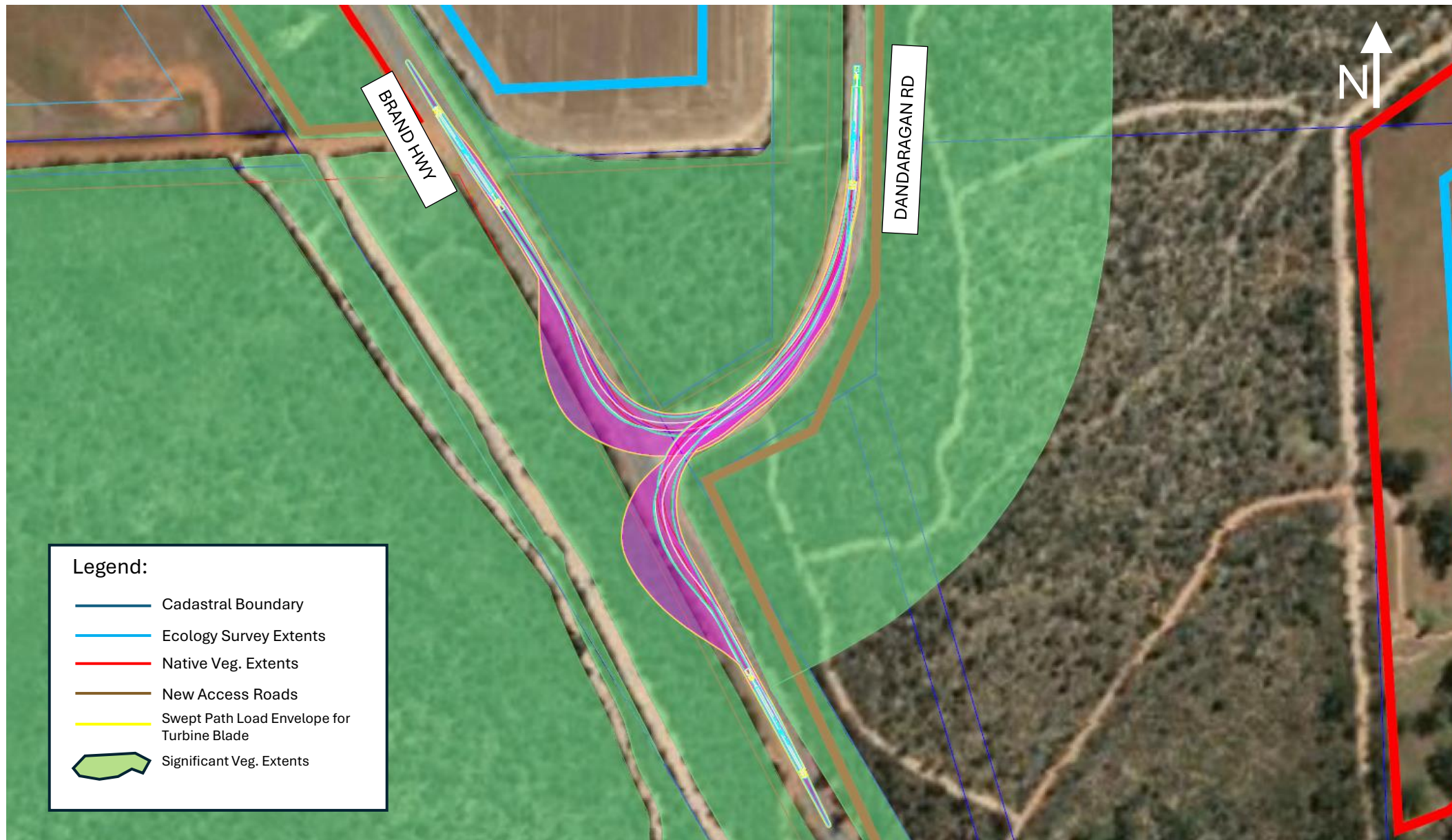
- Prime mover and extendable trailer configuration, based on the Vestas Blade Pinned Trailer in AUTOTURN
- 91m blade with 5m maximum width
- Prime mover length and width of 6.7m x 2.5m
- Trailer length of 60.5m with blade rear over sail of 31.8m. Trailer width of 3.4m
- Total combination length of 103.1m
- Rear wheel configuration of trailer set to rear-steerable
- Clearance envelope of 0.5m

## Transformer

- Prime mover and platform trailer configuration, based on the 190T Transformer in AUTOTURN.
- Adopted single point of articulation between prime mover and trailer (as per template) for conservativeness. Whilst two points of articulation could be the case for some transport operators, this would result in a smaller swept path.
- There is risk that operators could opt for a different vehicle configuration to those modelled, which may result in different spatial requirements. However, above approach is likely to accommodate most situations. An increase in transformer size may also result in changes to vehicle configuration.
- Prime mover length and width of 7.8m x 2.5m.
- Total combination length of 44m
- Trailer length and width of 31m and 4.2m (assumed transformer does not hang over trailer)
- Trailer wheel configuration set to dual-steer.
- Clearance envelope of 0.5m.

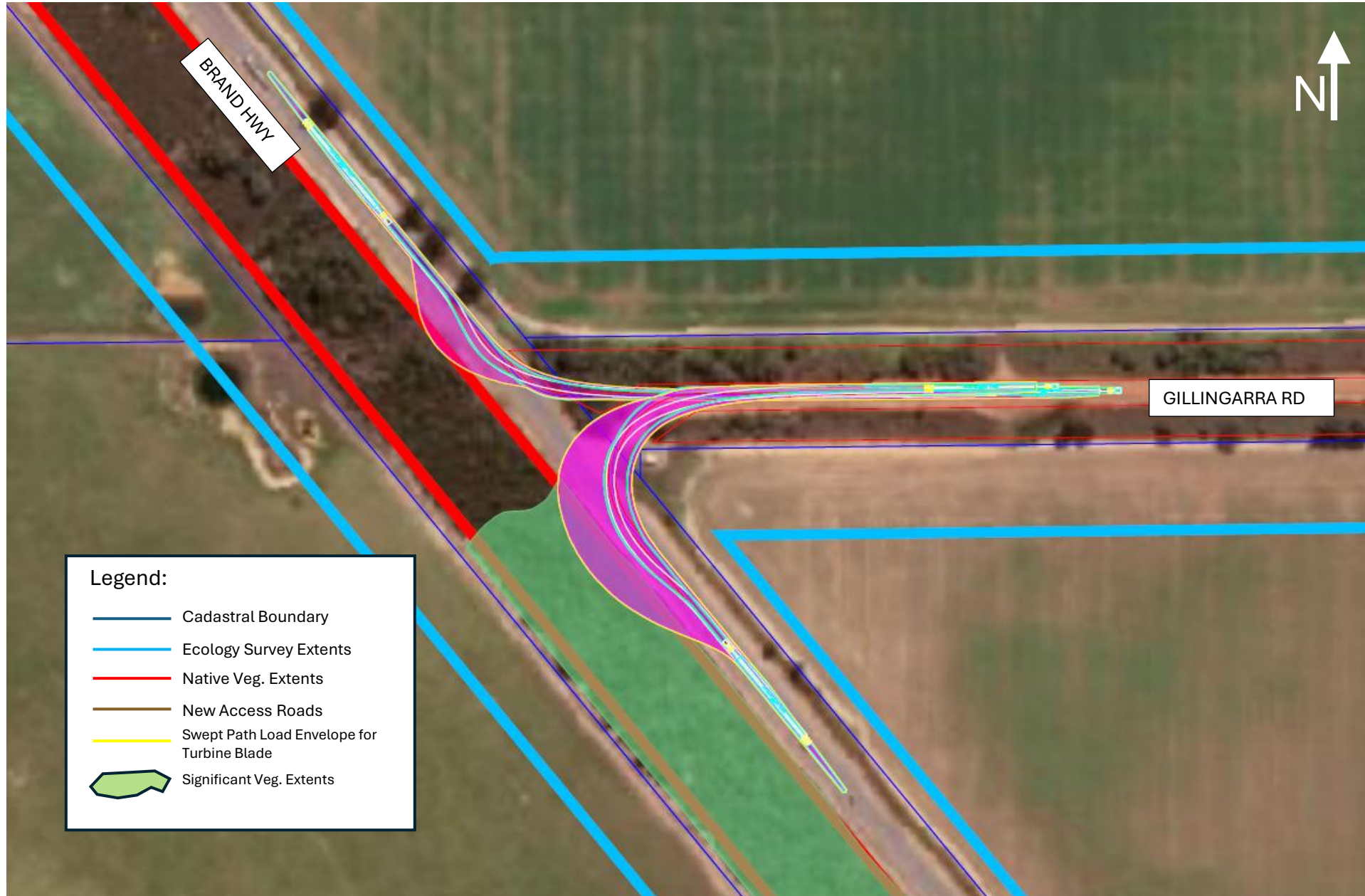
①

# Dandaragan Road Site Access



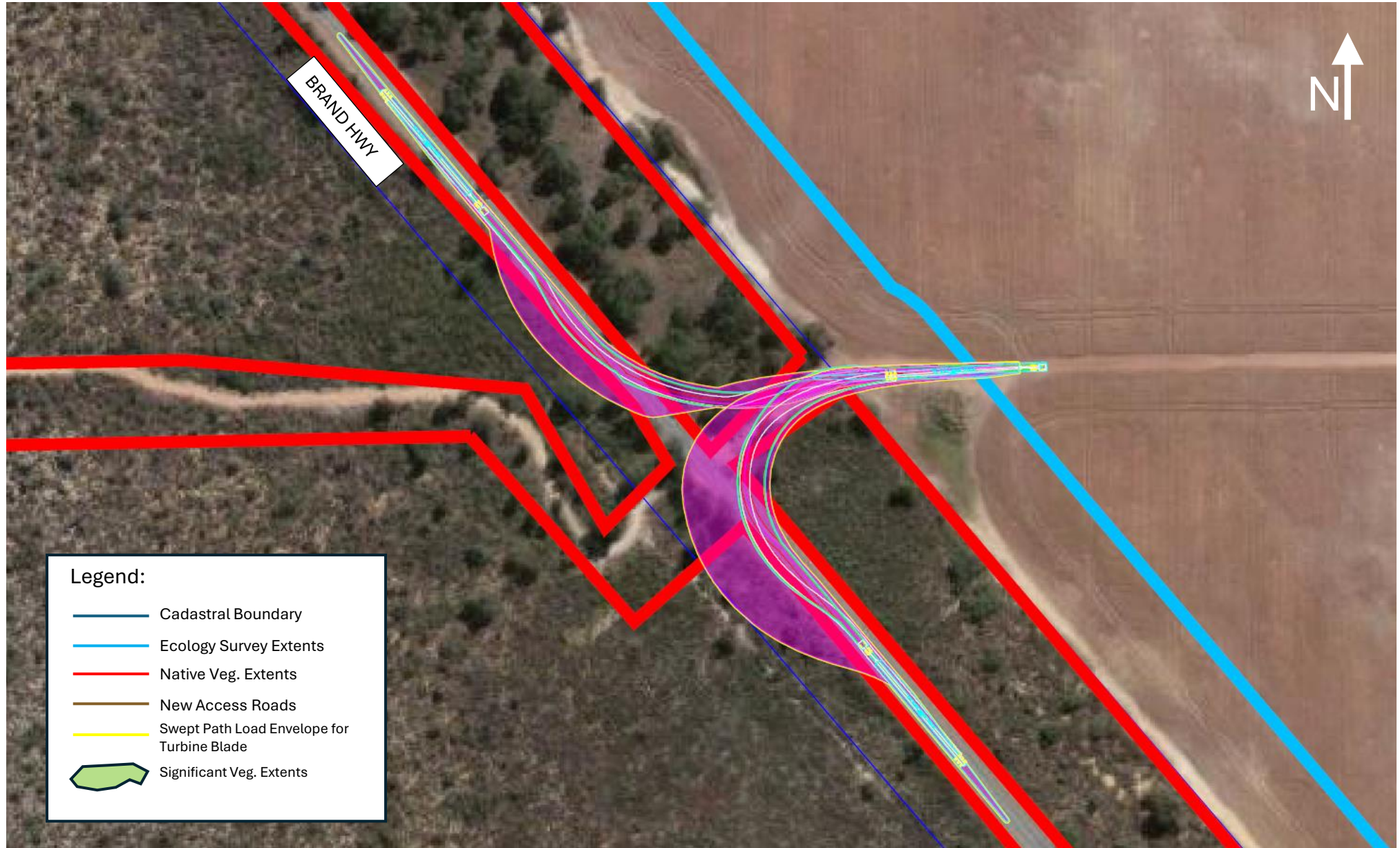
②

# Gillingarra Site Access



③

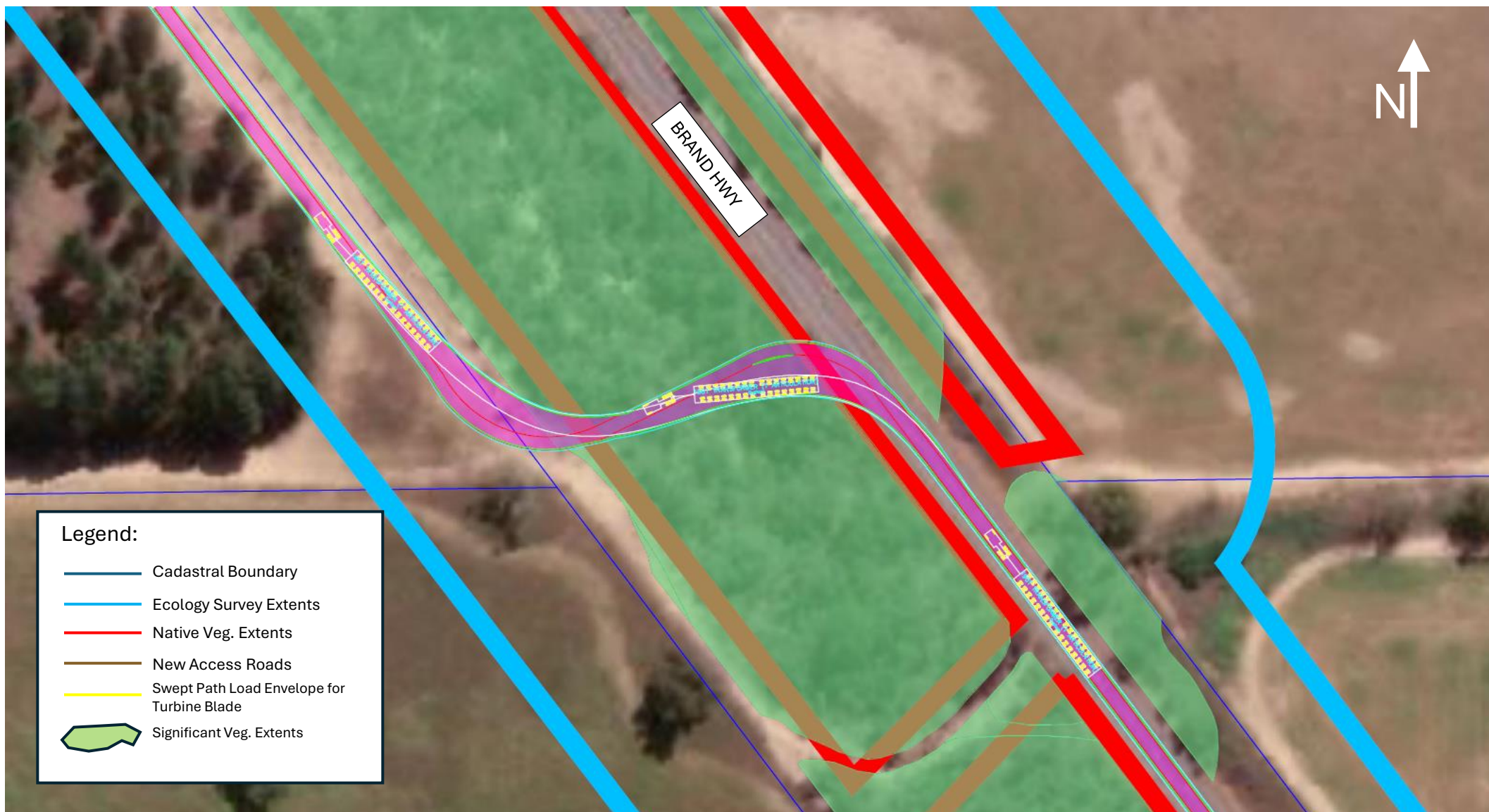
### Alternate Access via Gate off Brand Highway



④

## Substation Access via Gate off Brand Highway

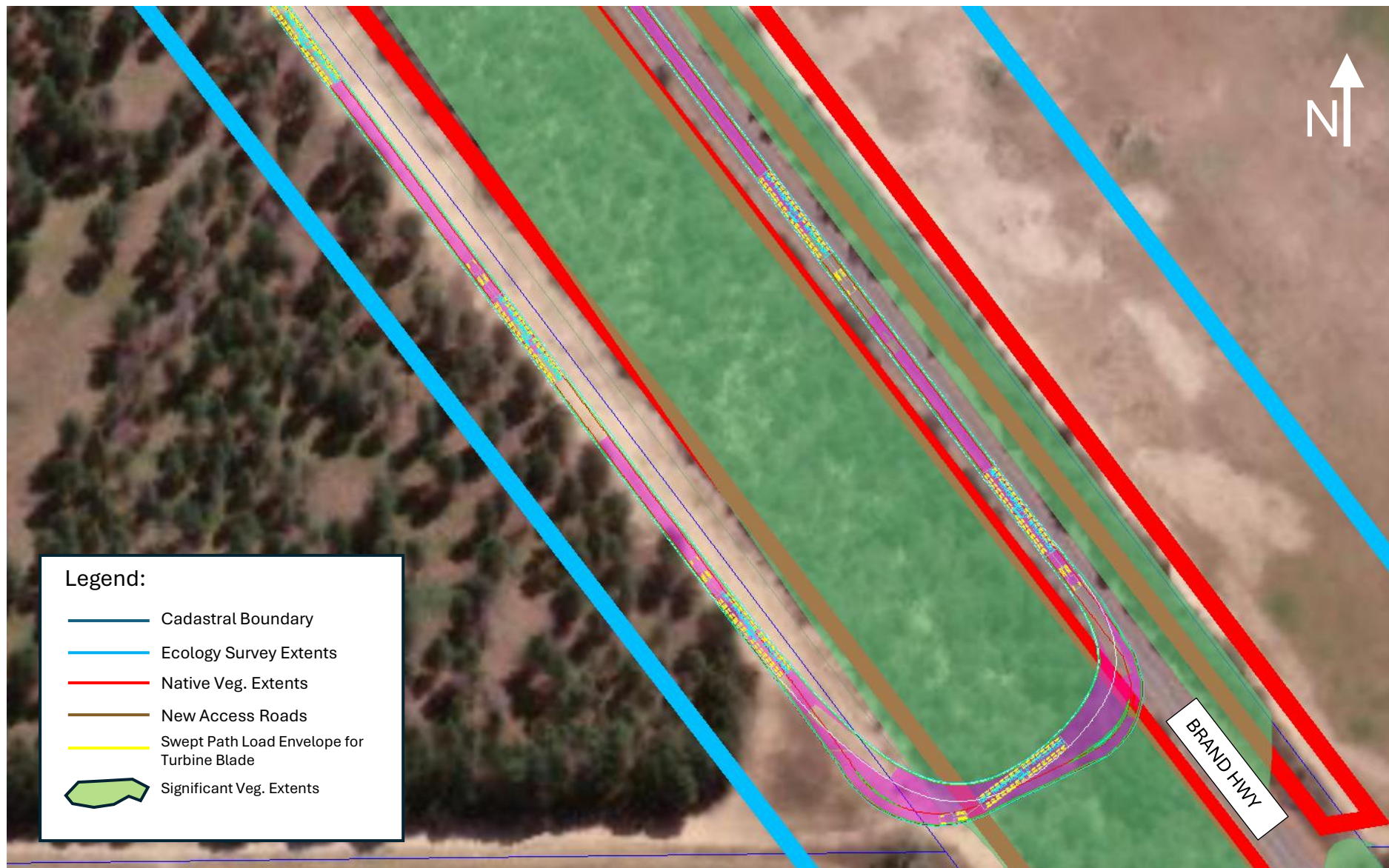
### 190T Transformer – Option 1 (1 Articulation Point) – Northbound Approach



④

## Substation Access via Gate off Brand Highway

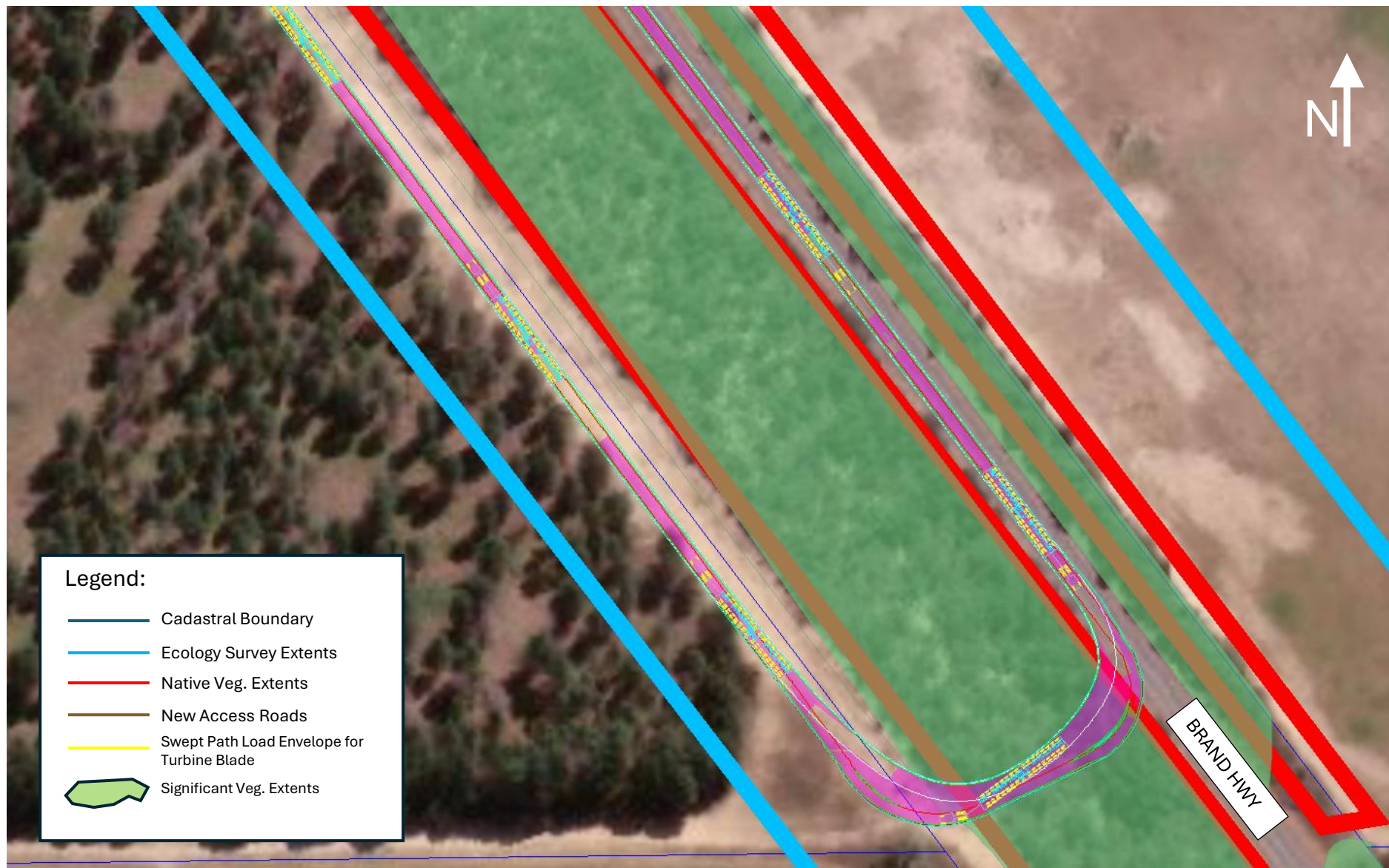
### 190T Transformer – Option 1 (1 Articulation Point) – Southbound Approach



④

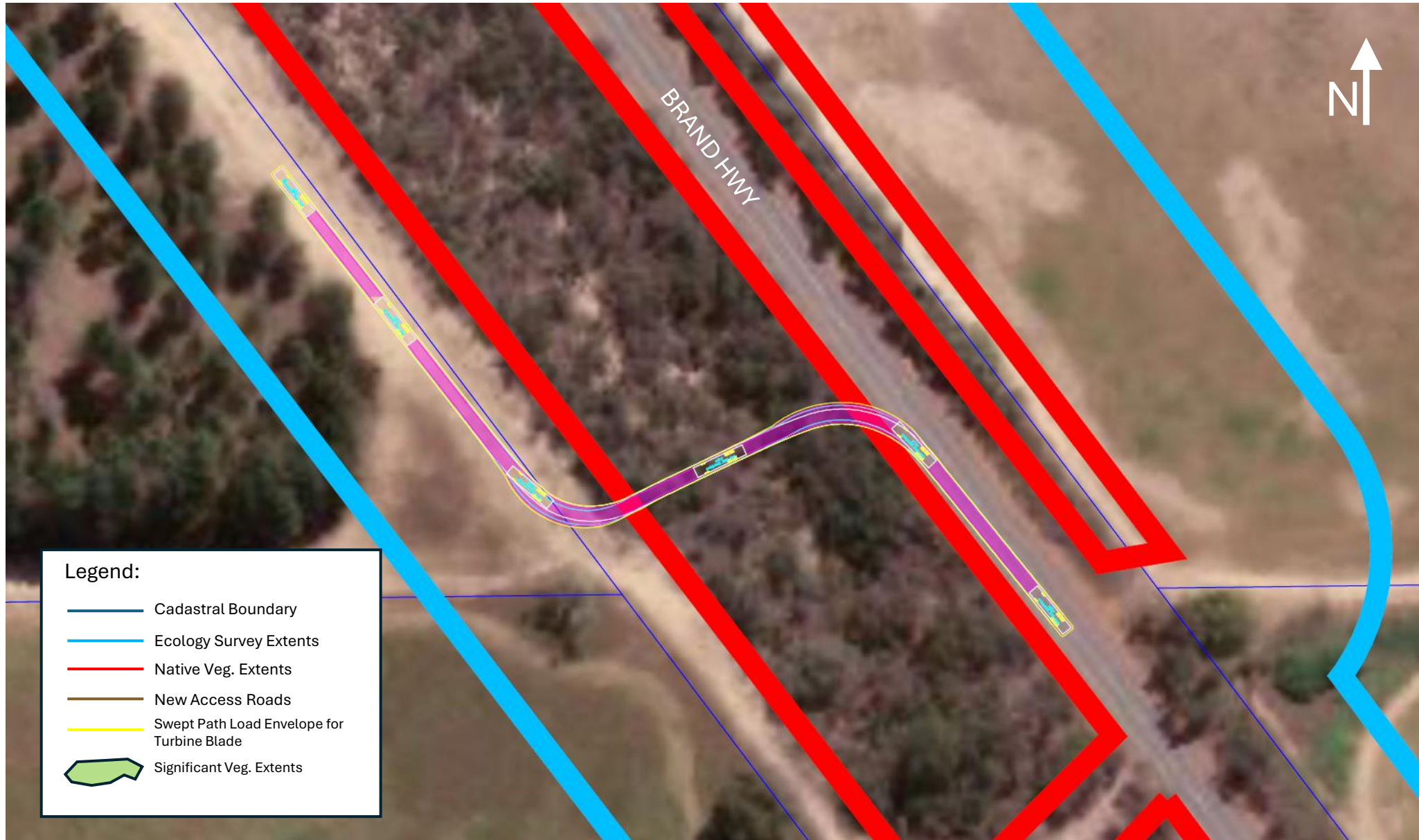
## Substation Access via Gate off Brand Highway

### 190T Transformer – Option 1 (1 Articulation Point) – Southbound Approach



# Substation Access via Gate off Brand Highway

## 12.5m Heavy Rigid Vehicle – Northbound Approach



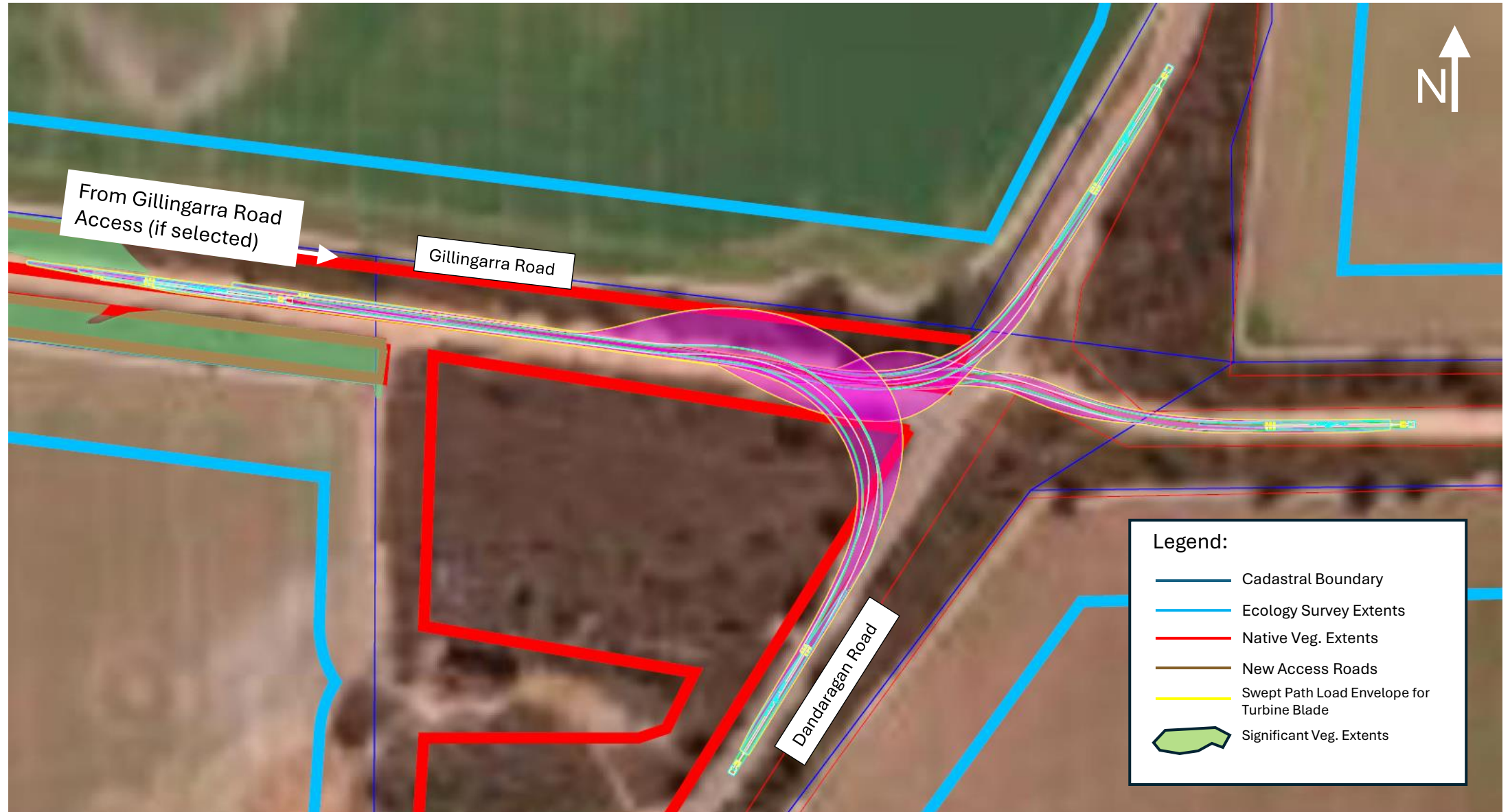
# Substation Access via Gate off Brand Highway

## 12.5m Heavy Rigid Vehicle – Southbound Approach



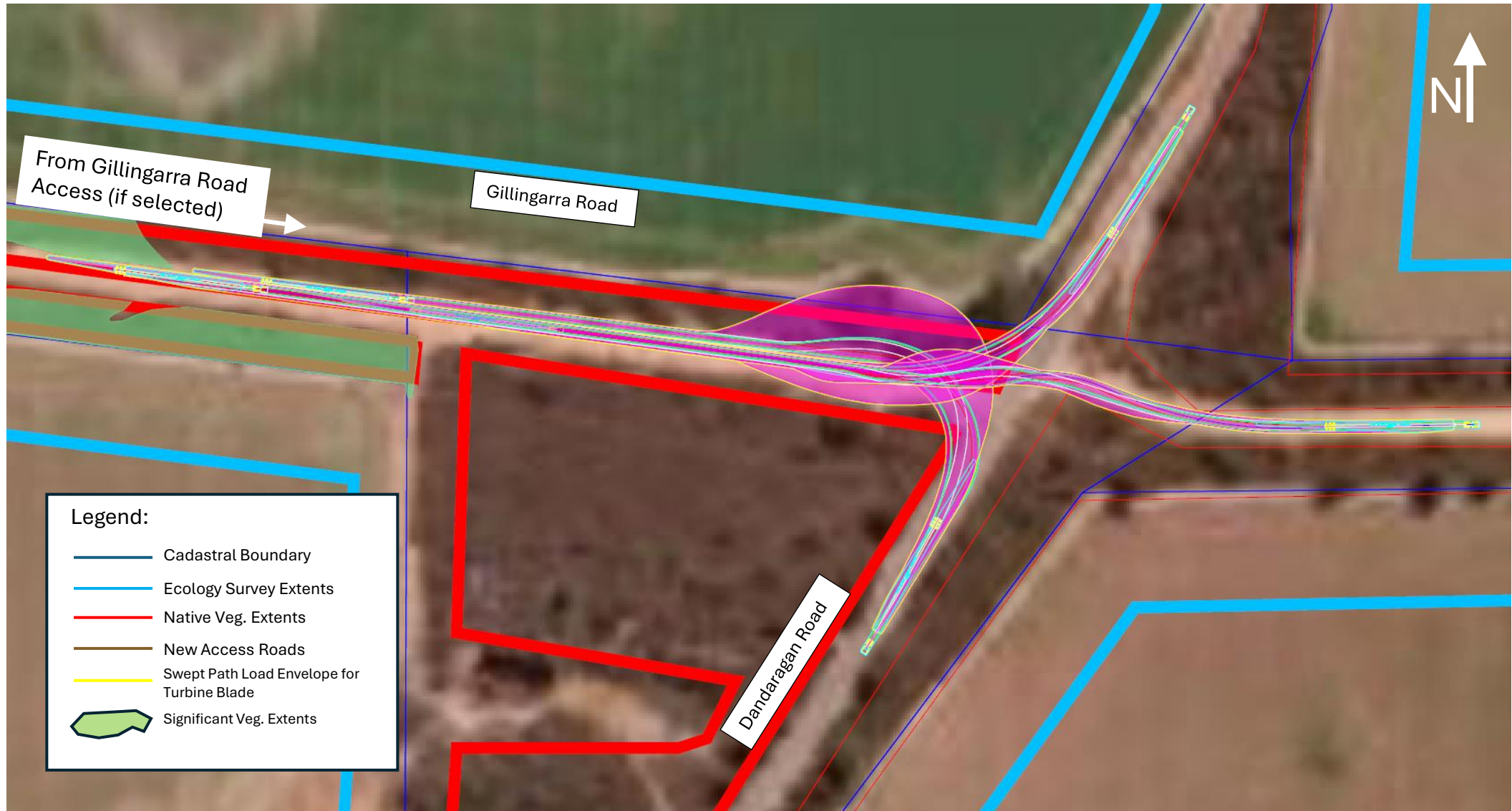
1

# Turn From Gillingarra Road Northwards onto Dandaragan Road, Southwards onto Dandaragan Road and continuing East on Gillingarra Road



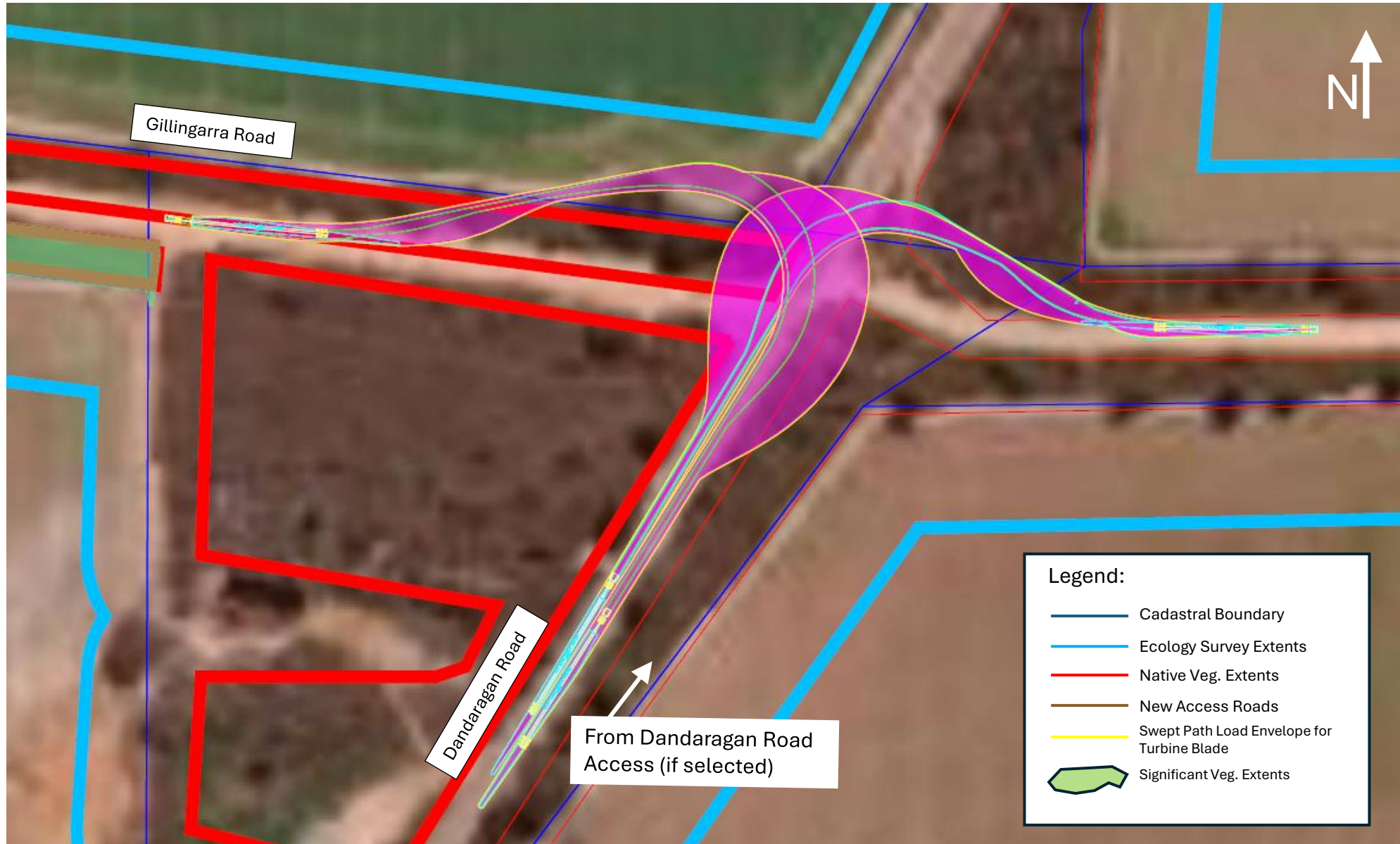
1

# Turn From Gillingarra Road Northwards onto Dandaragan Road, Southwards onto Dandaragan Road and continuing East on Gillingarra Road (minimising impact to vegetation)



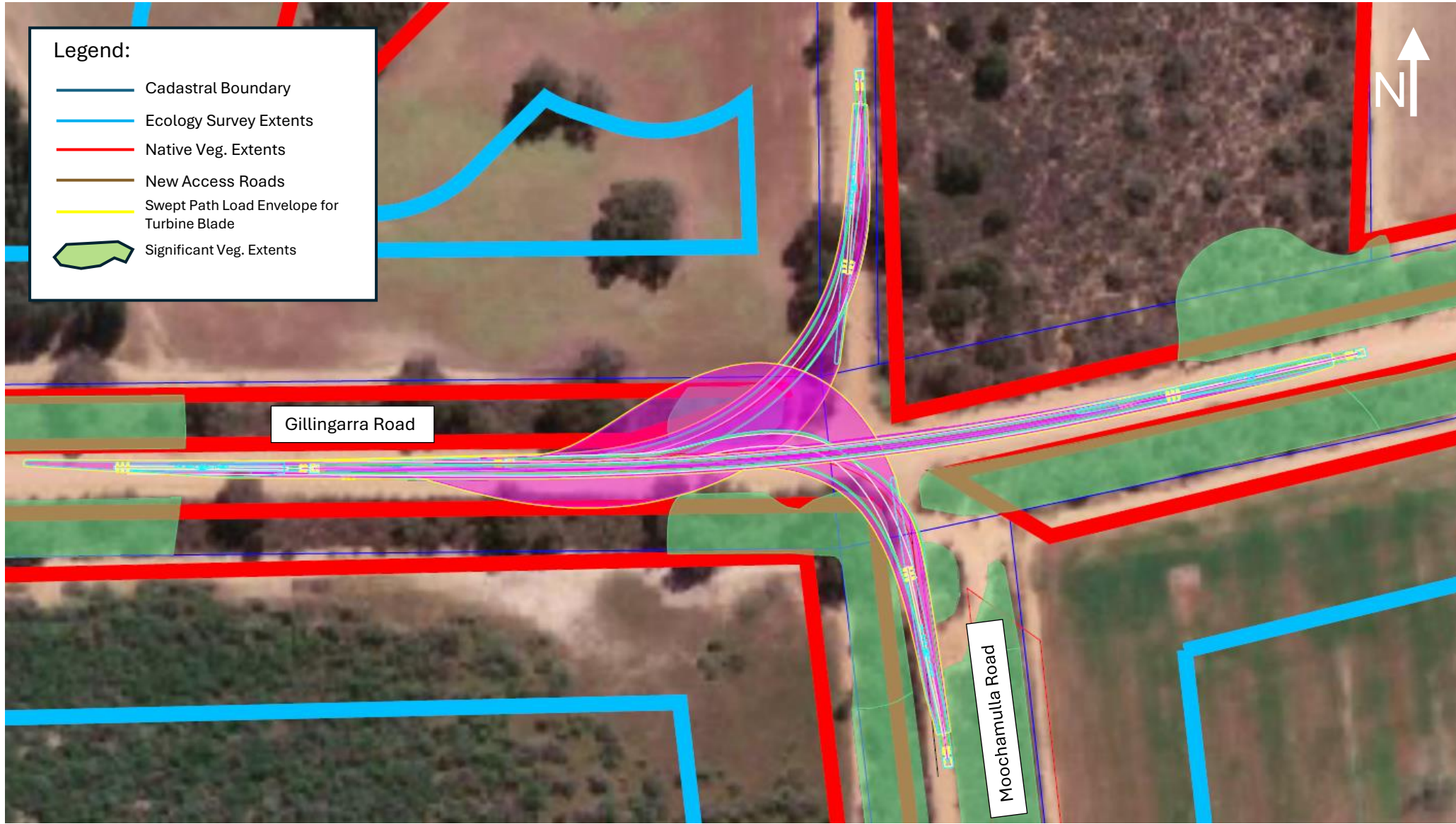
1

# Turn From Dandaragan Road Eastwards onto Gillingarra Road, Westwards onto Gillingarra Road and continuing North on Dandaragan Road (minimising impact to vegetation)



2

## Turn From Gillingarra Road Northwards onto Moochamulla Road, Southwards onto Moochamulla Road and continuing East on Gillingarra Road



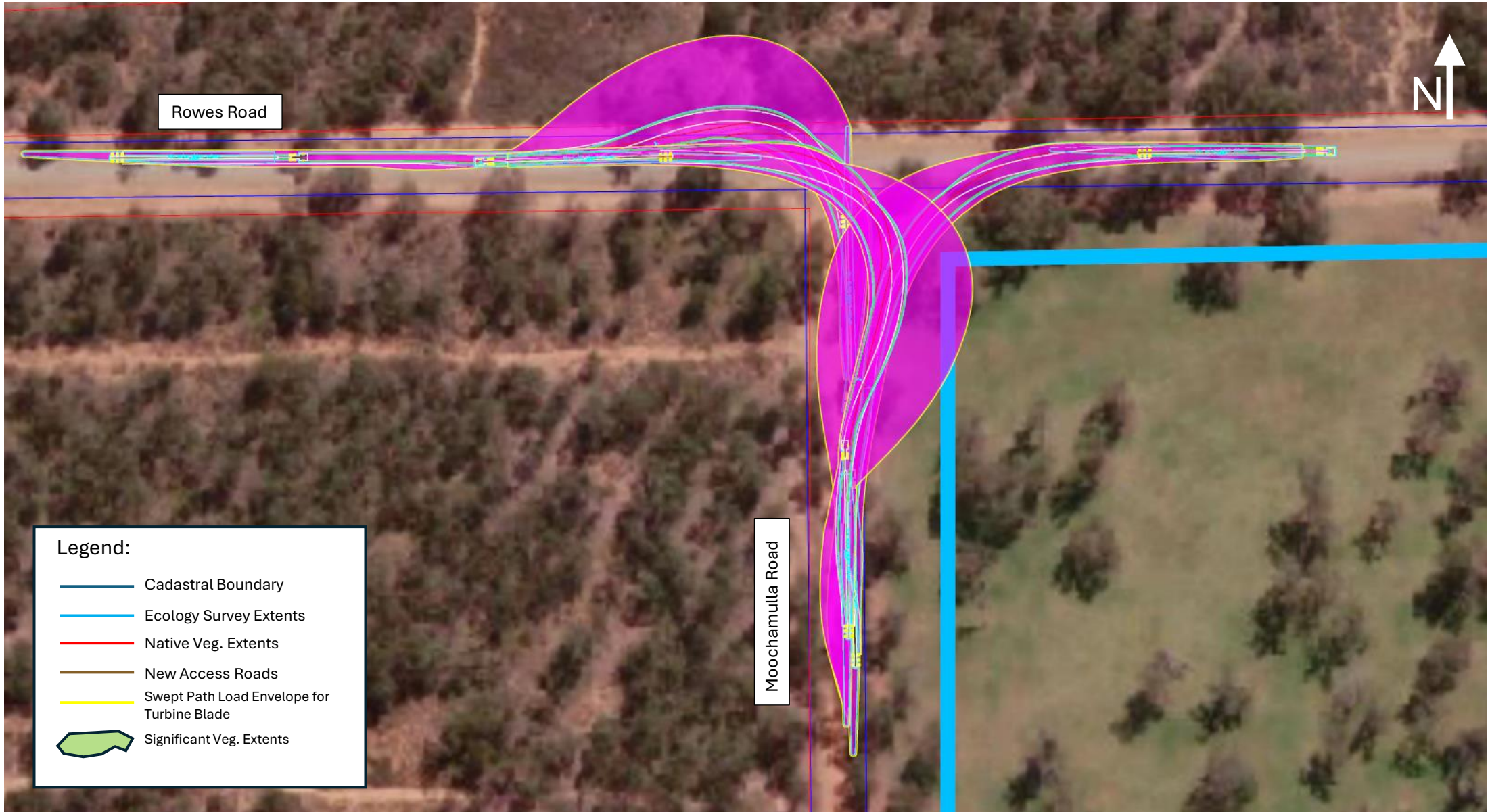
3

### Turn From Dandaragan Road Eastward on Rowses Road and Westwards on Rowses Road



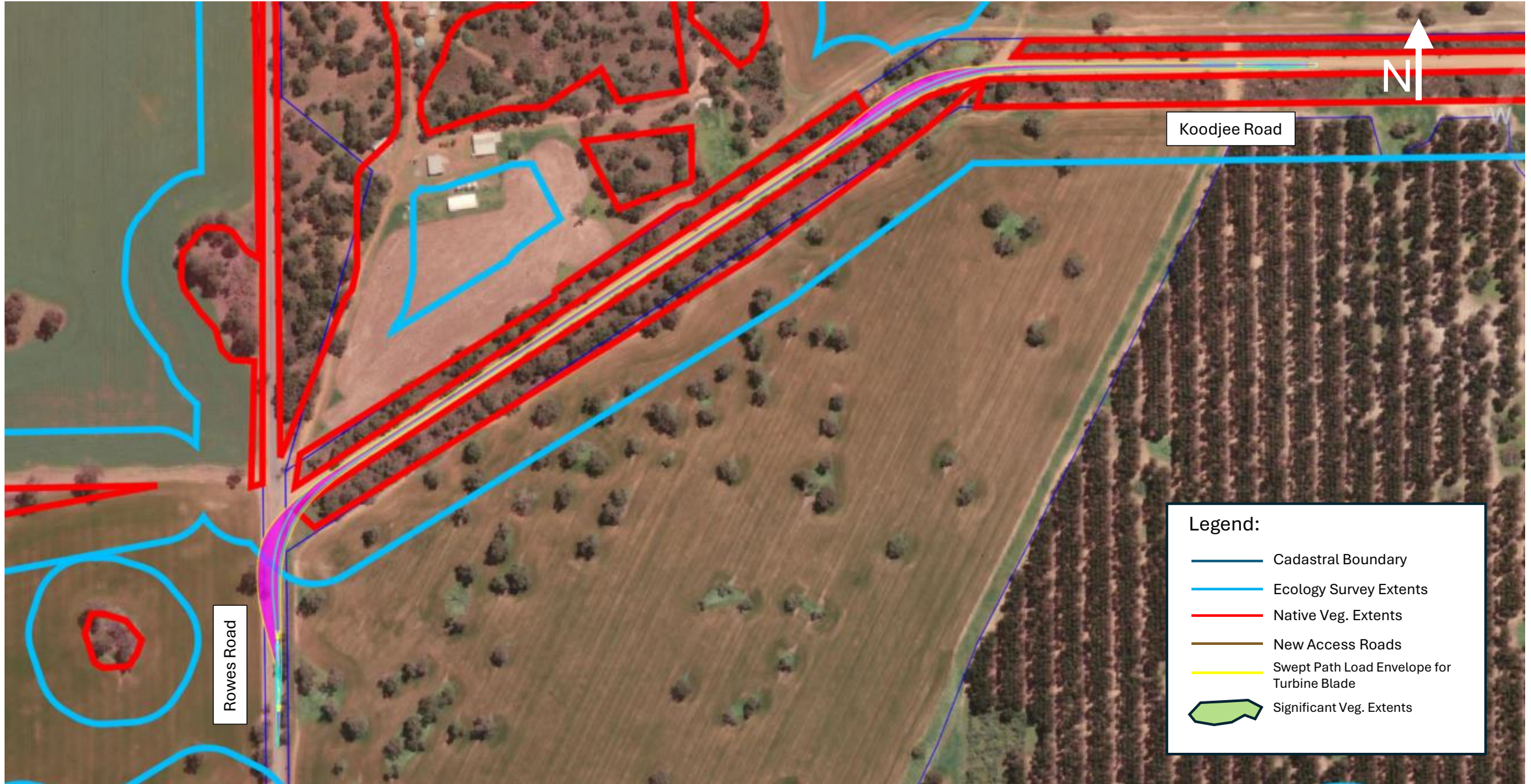
4

# Turn From Moochamulla Road Eastwards onto Rowses Road, Westwards onto Rowses Road and turning from Rowses Road Southwards onto Moochamulla Road



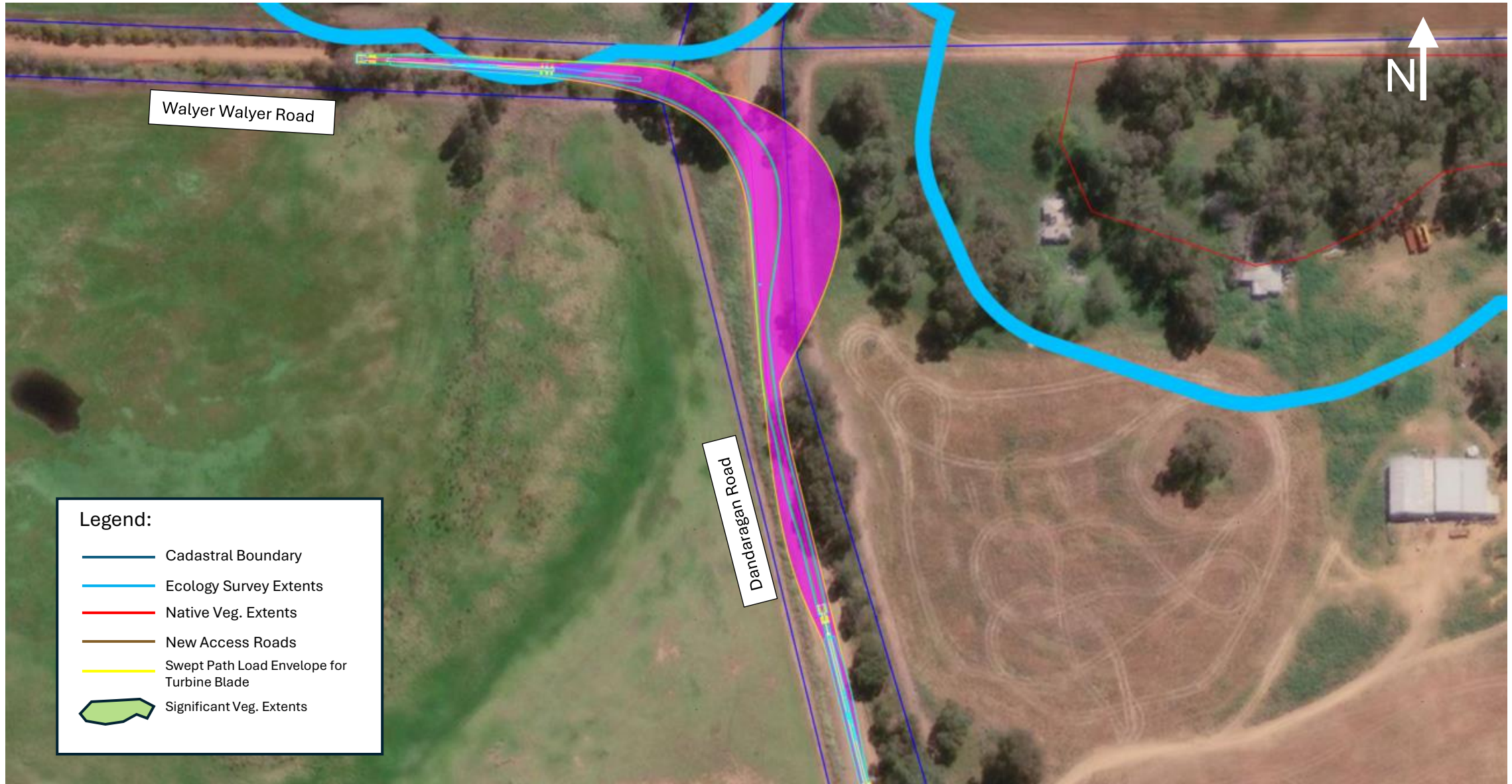
5

# Turn From Rows Road Eastwards on Koodjee Road



6

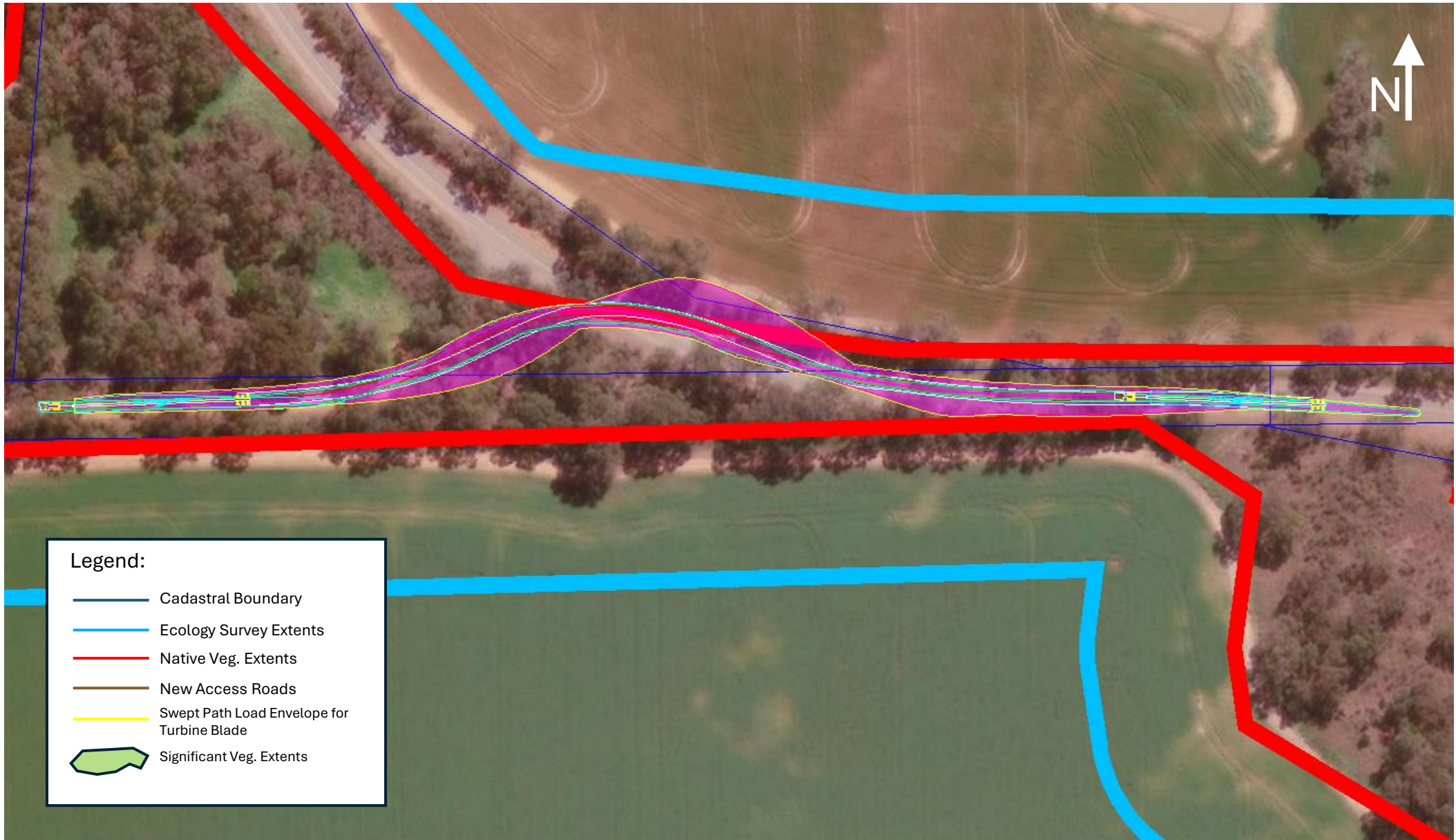
# Turn From Dandaragan Road Westward on Walyer Walyer Road



# Turn From Walyer Walyer Road Southwards

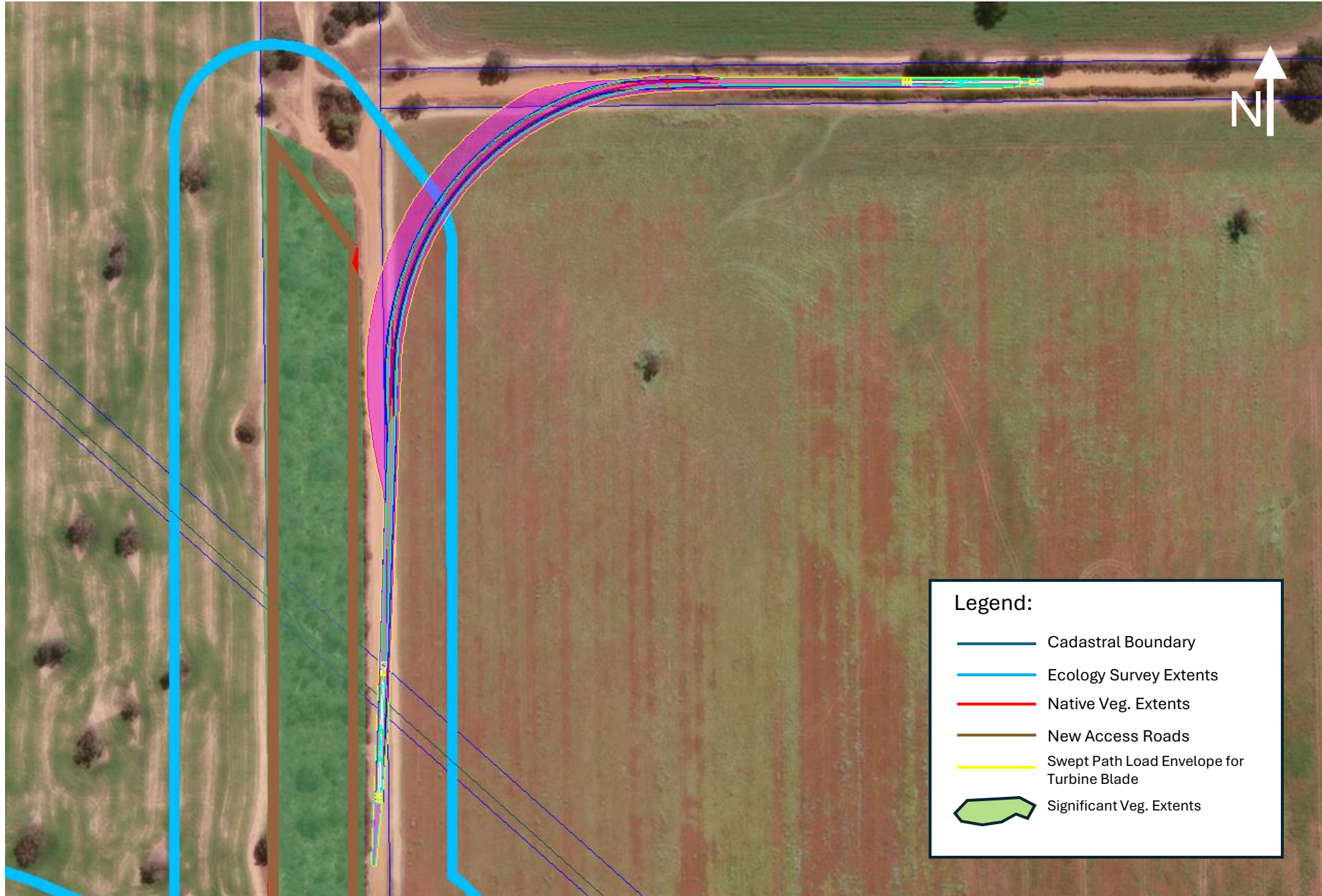


# Dandaragan Road to Wayloo Road westbound



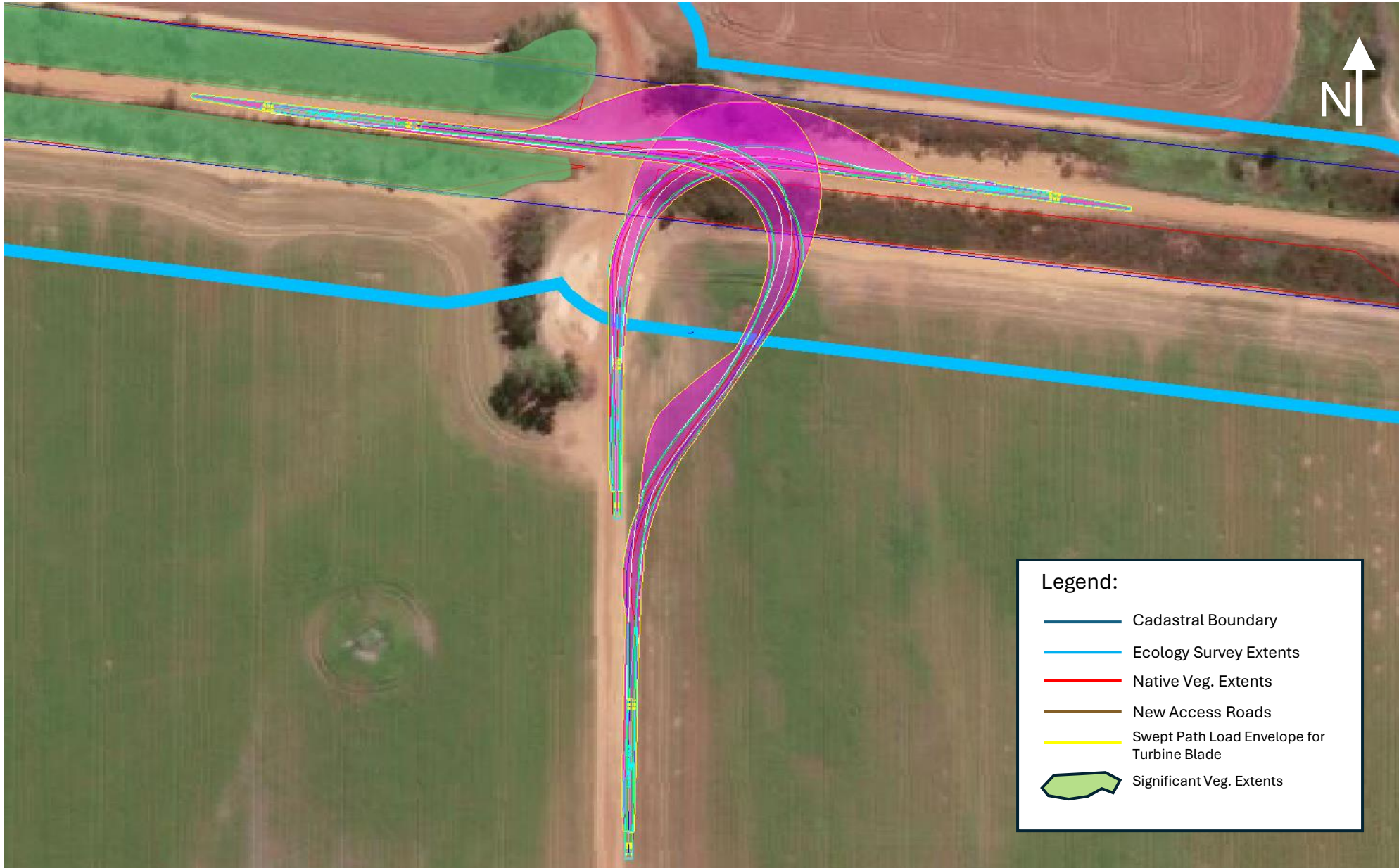
9

# Walyoo Road south approach turning east



1

# Turn From Gillingarra Road Southwards Towards Turbine 34

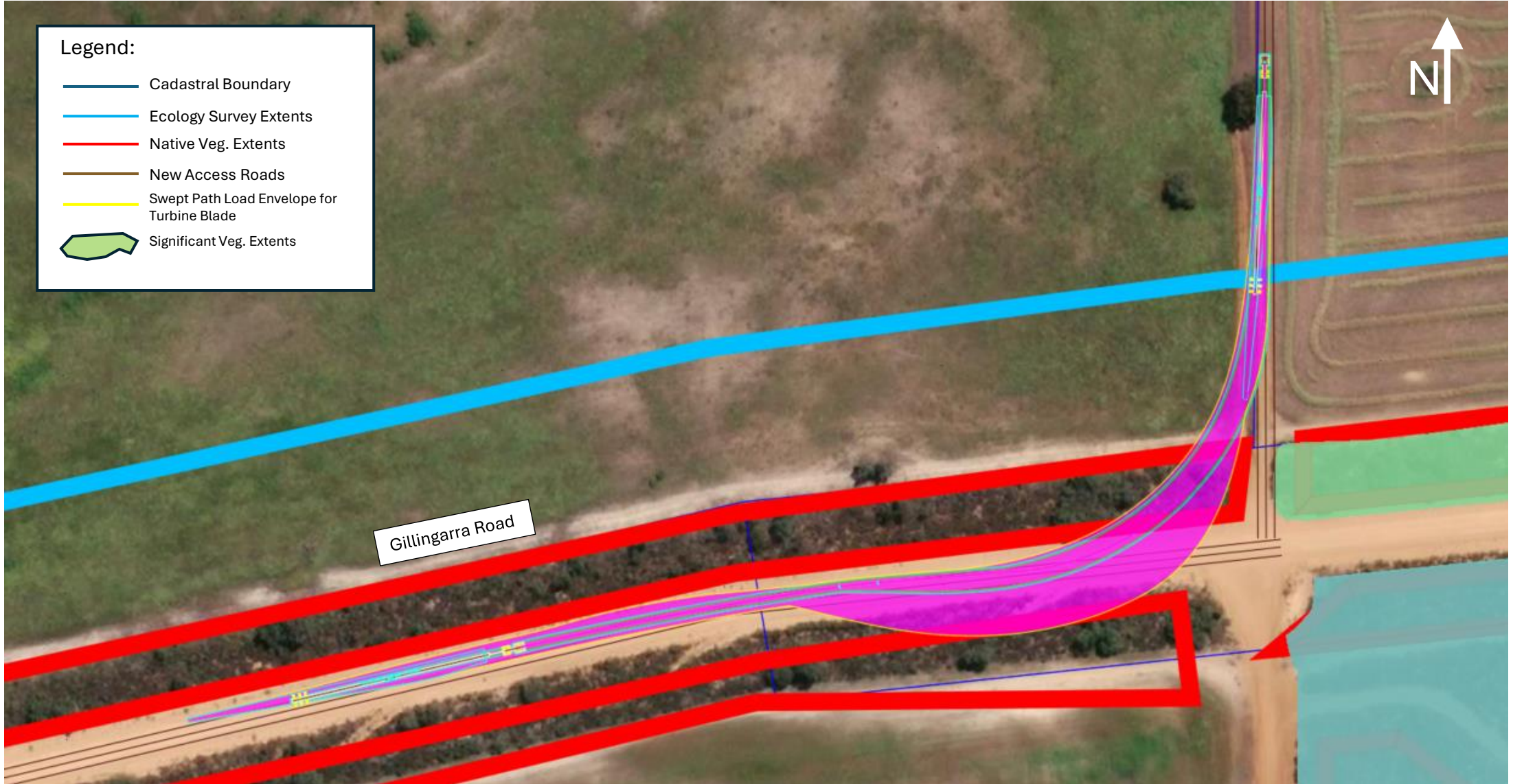


2

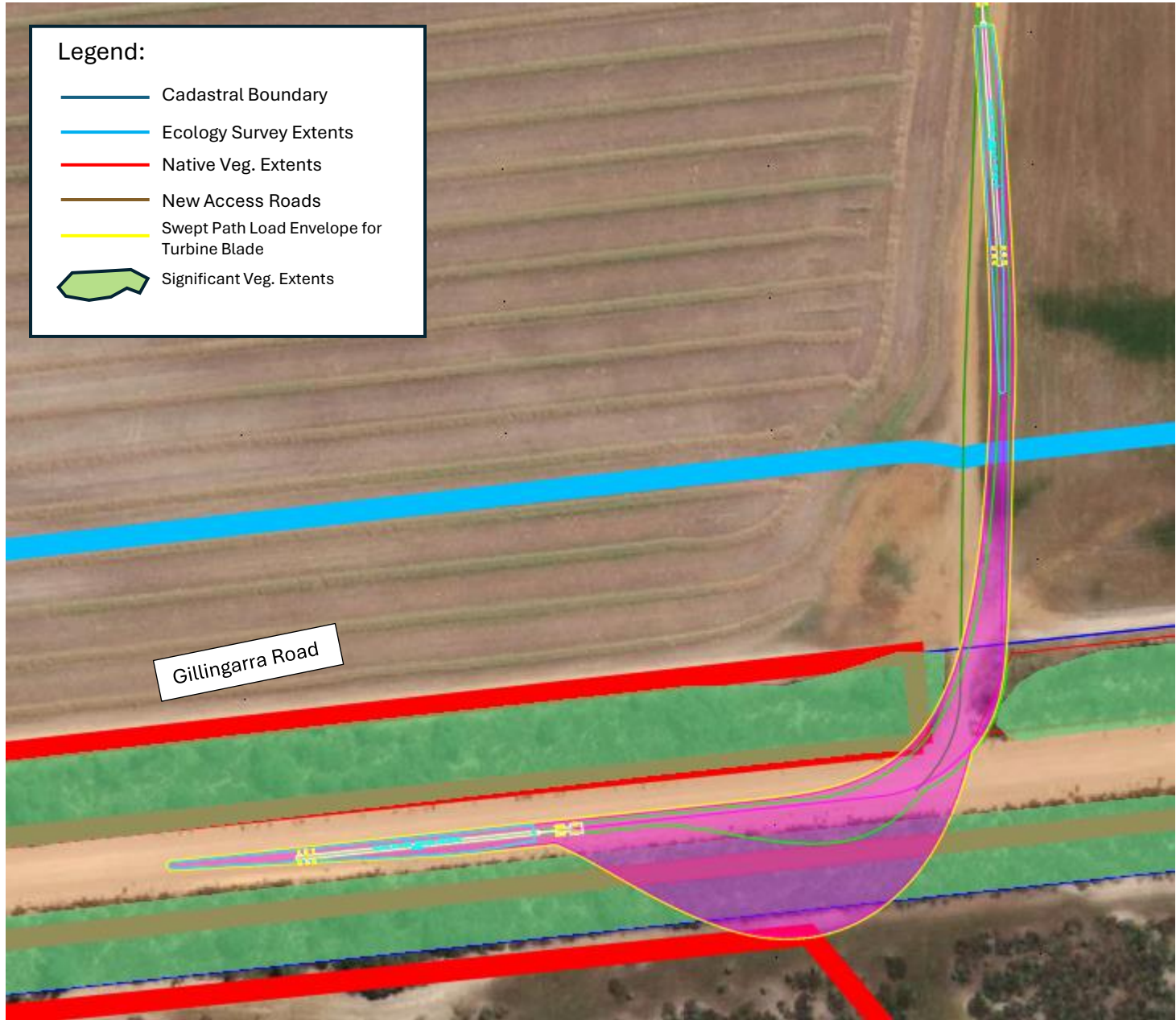
## Turn from Dandaragan Road Eastwards



# Turn From Gillingarra Road Northwards

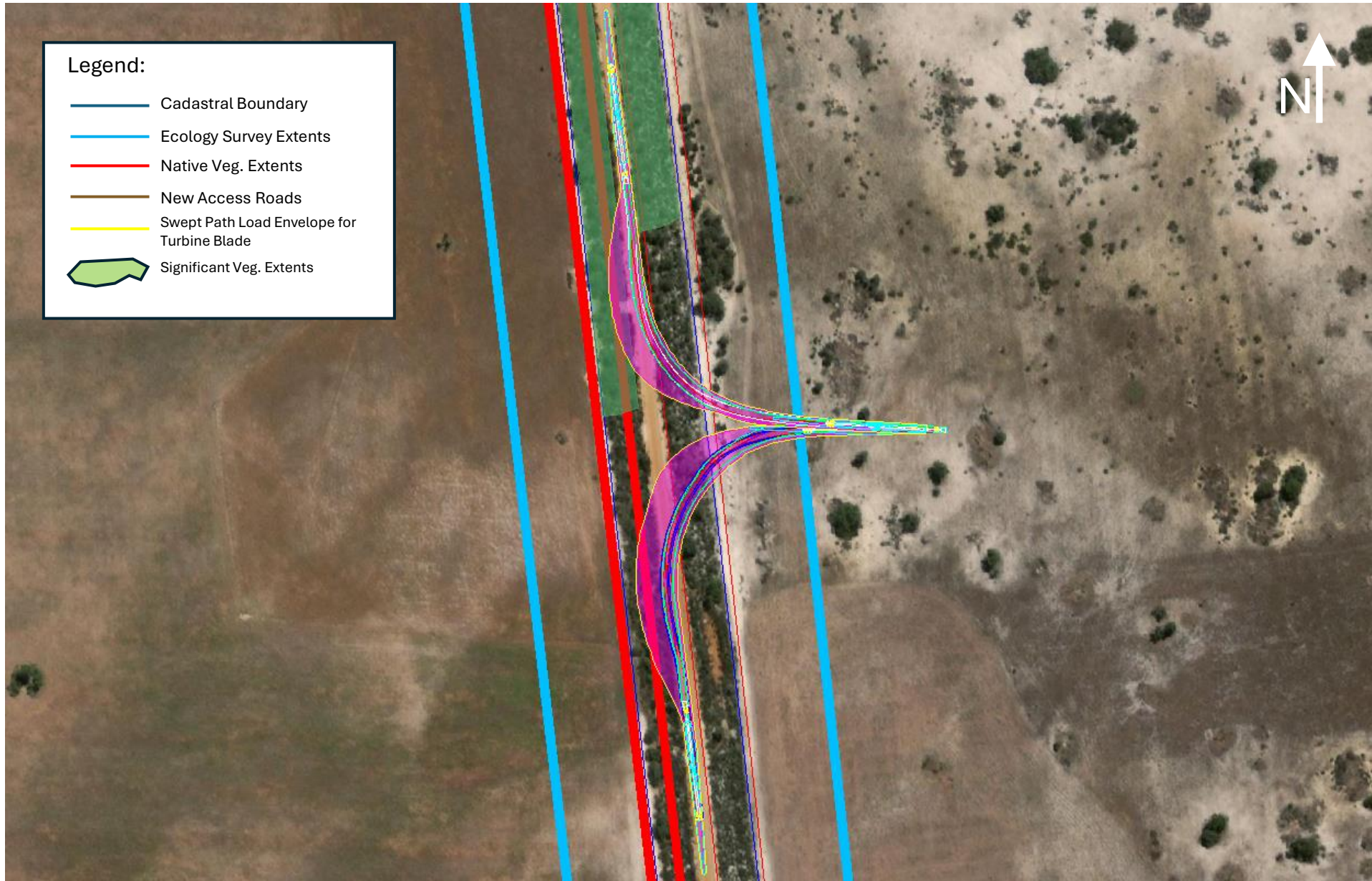


# Turn From Gillingarra Road Northwards



5

# Moochamulla Road turning eastbound



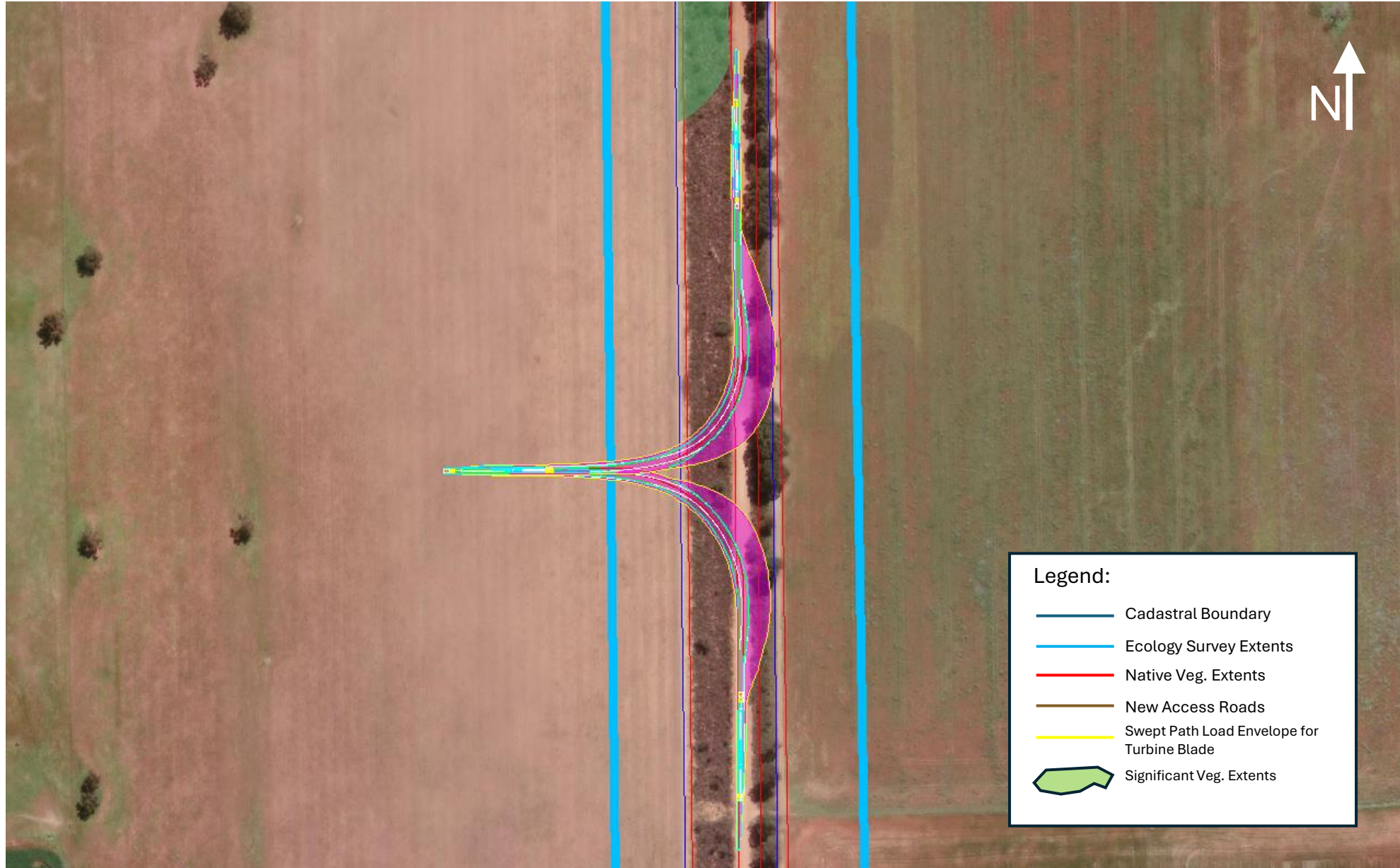
6

# Turning Westwards



# Walyoo Road turning west

7



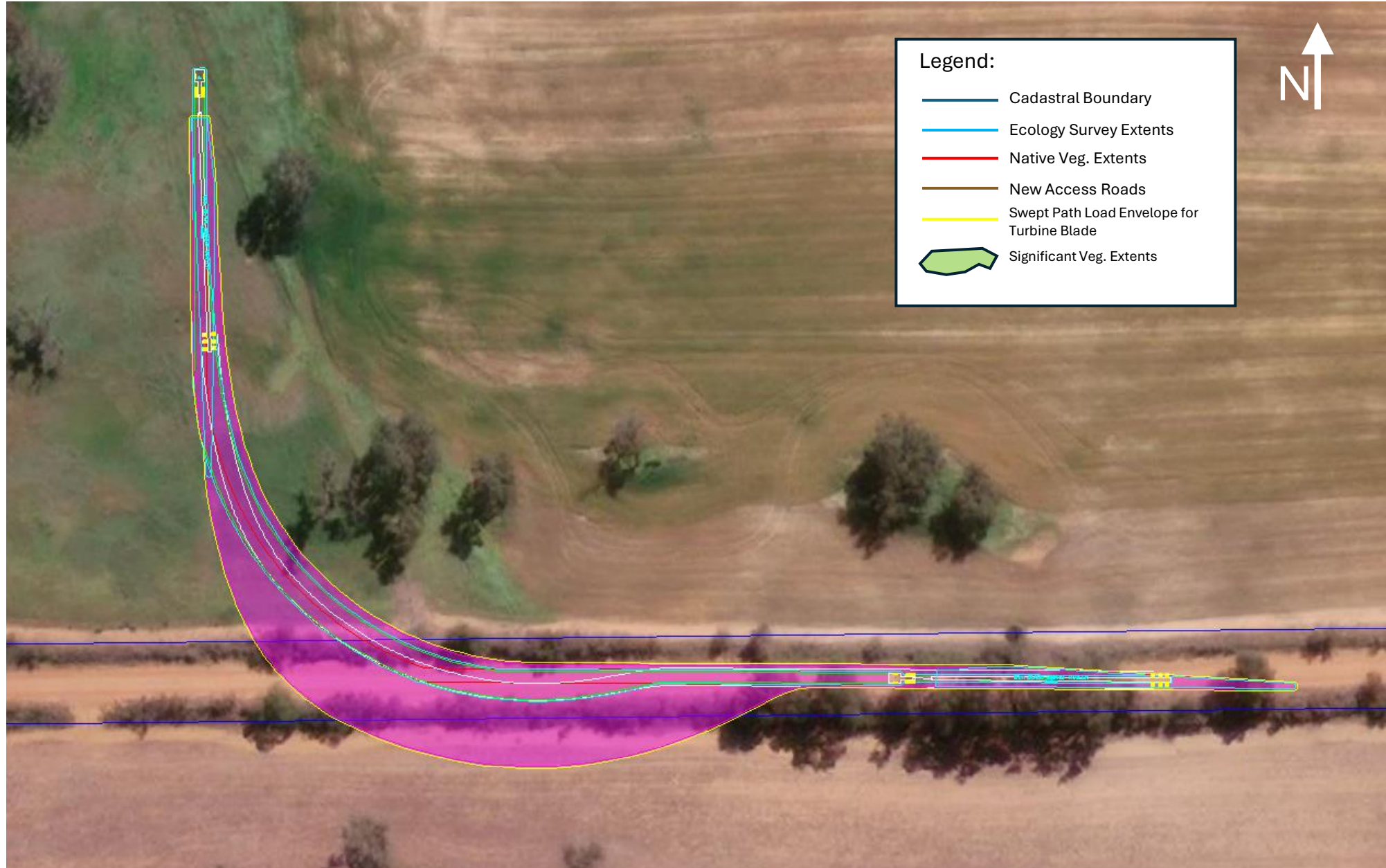
8

# Walyoo Road north approach turning west



9

# Walyoo Road east approach turning north



## Walyoo Road west and east approach turning south



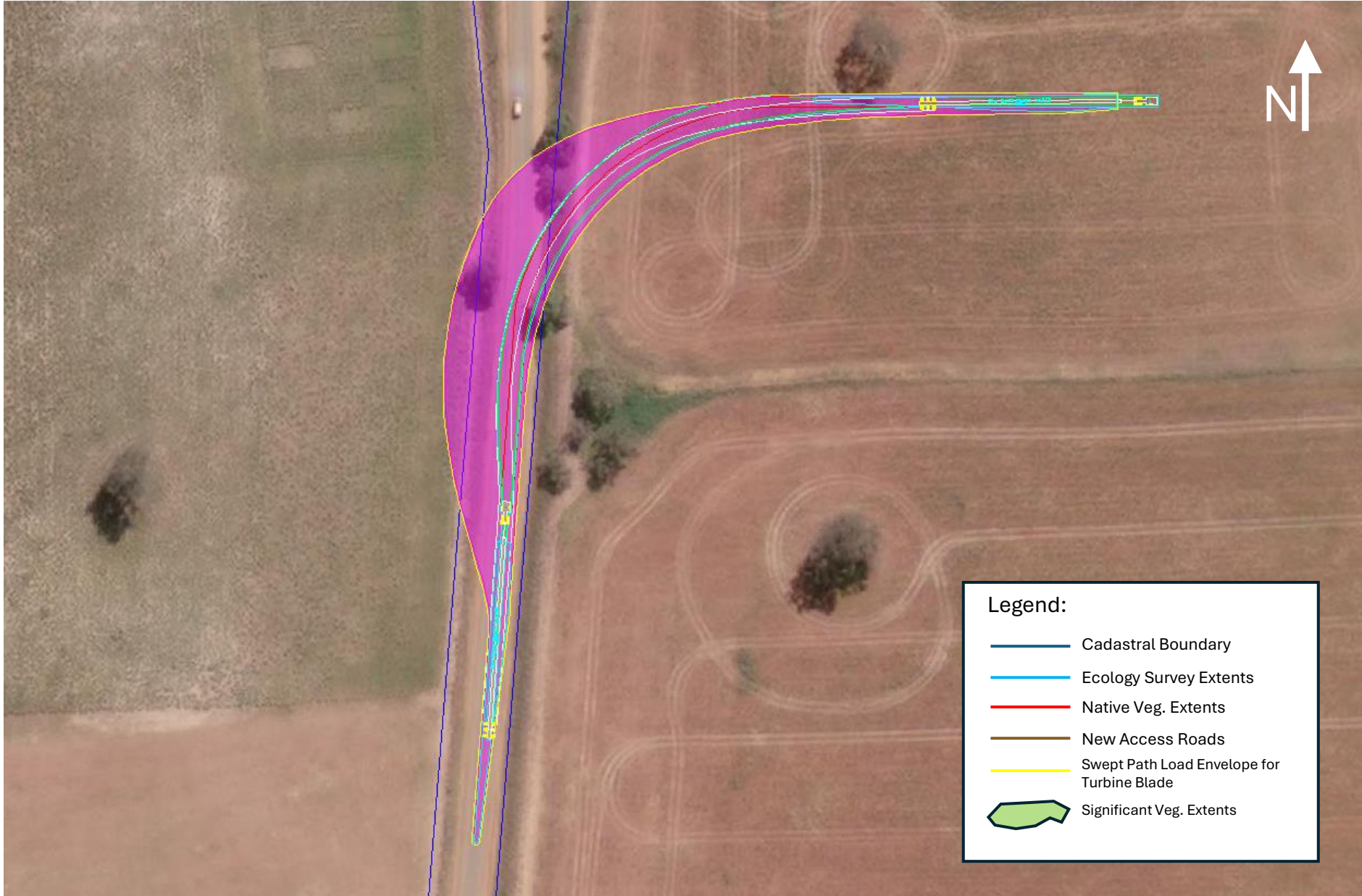
# Walyoo Road east approach turning north



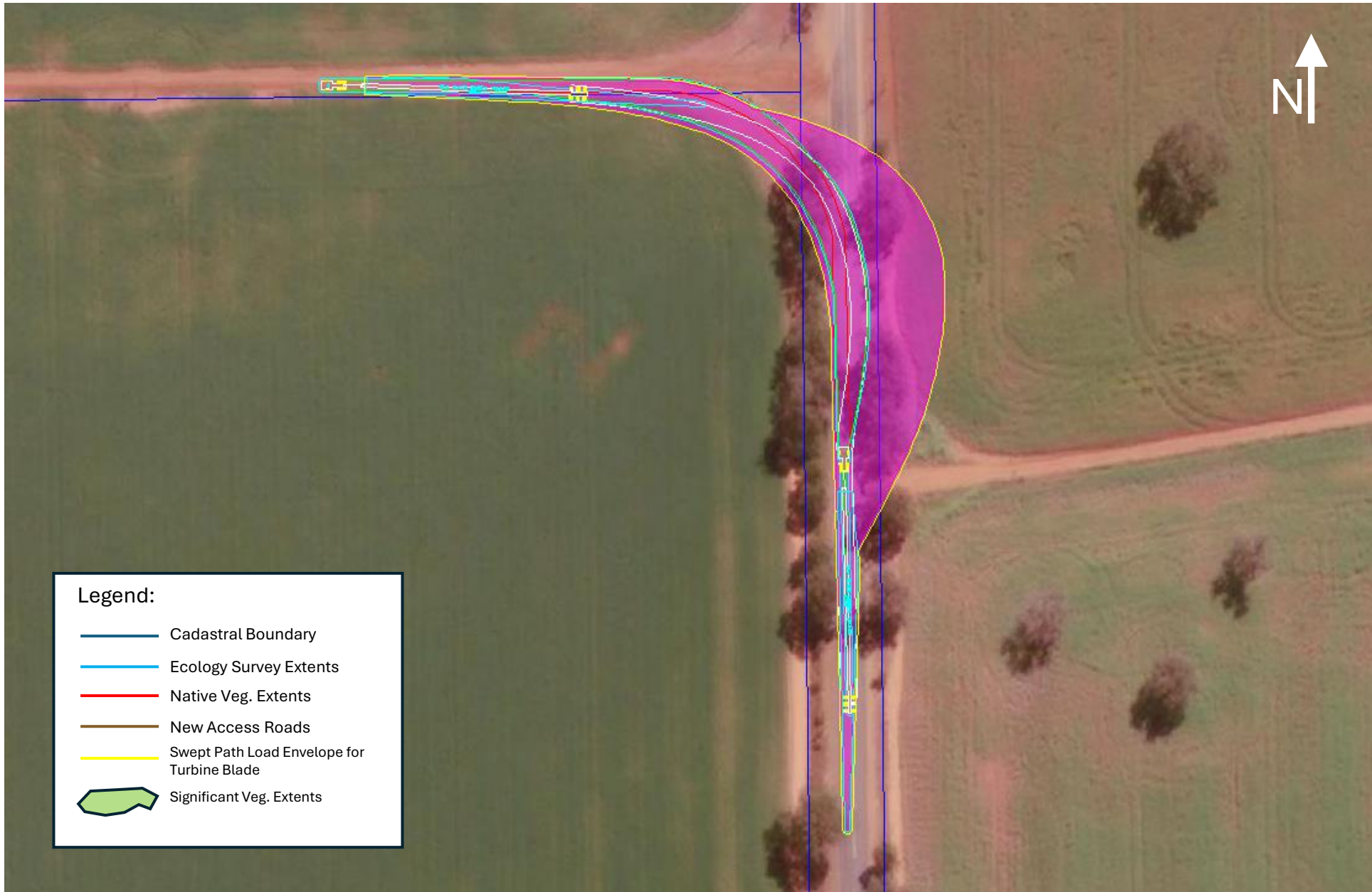
# Dandaragan Road south approach turning northeast



# Dandaragan Road south approach turning east



# Dandaragan Road south approach turning west



# Dandaragan Road south approach turning east

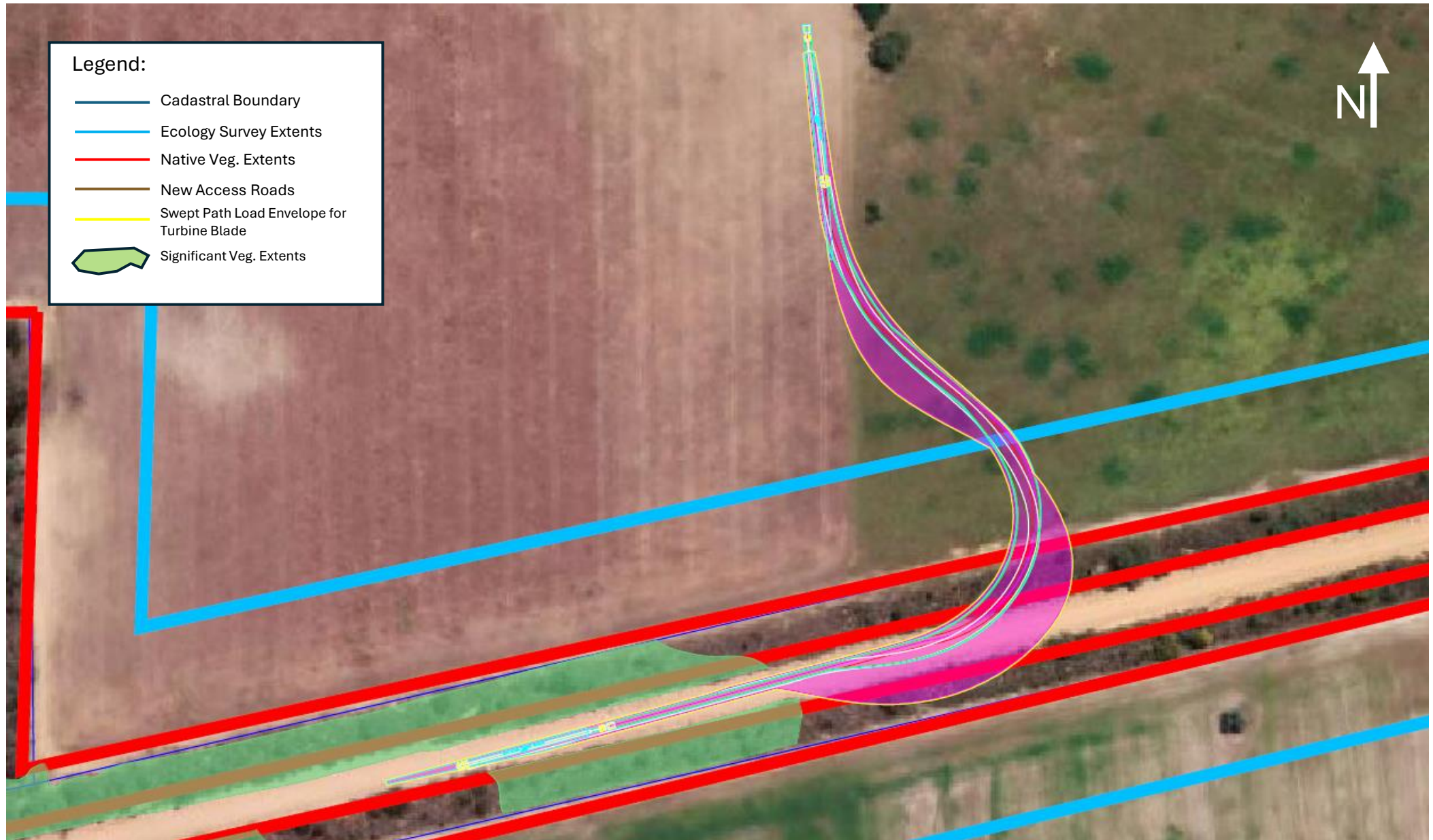


# Moochamulla Road south approach turning west



# Gillingarra Road west approach turning north

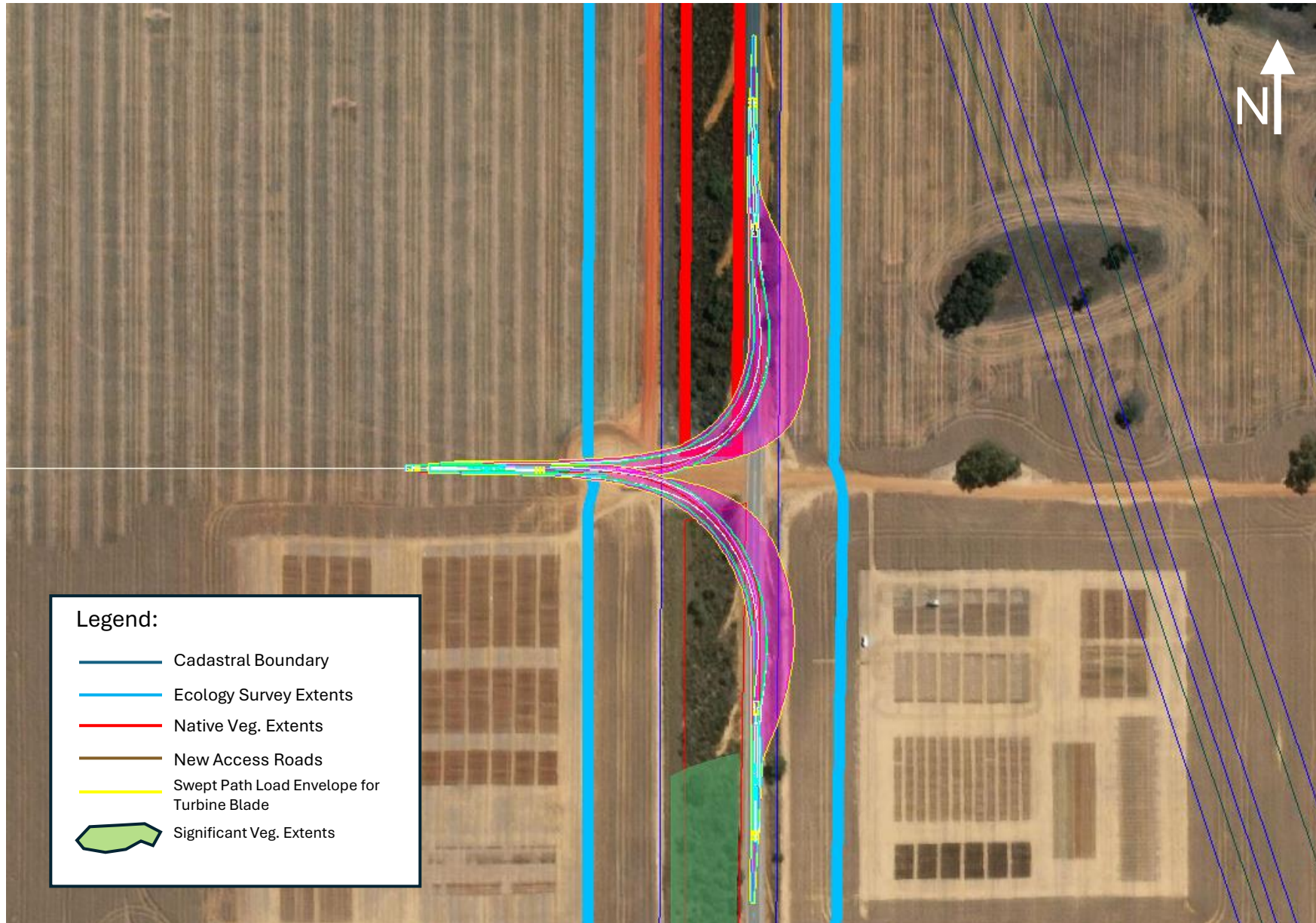
17



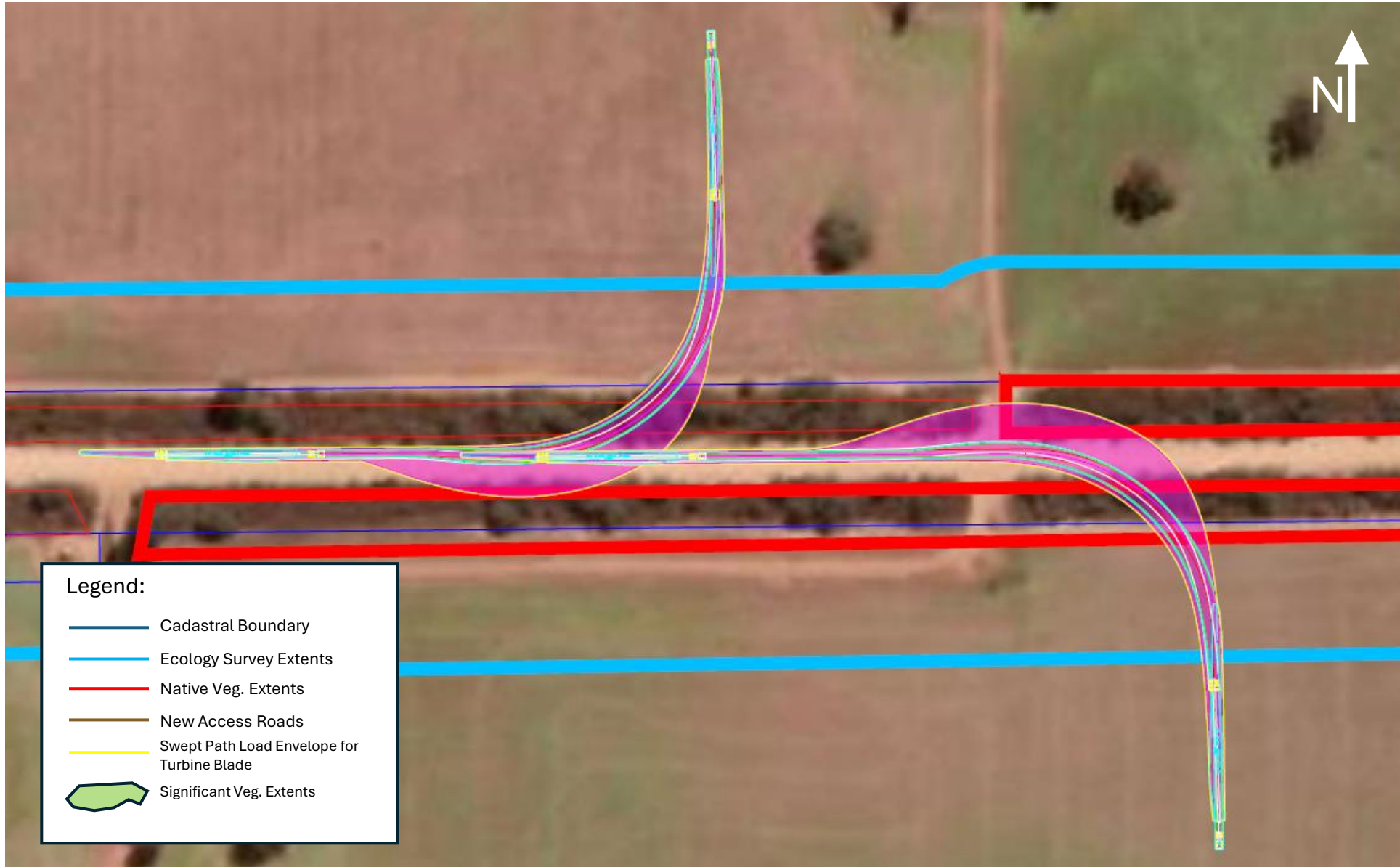
## Moochamulla Road north approach turning west



# Dandaragan Road south approach turning west



# Gillingarra Road approach turning north



# Appendix C – Main Roads Standard Drawings

DESIGN SPEED OF MAJOR ROAD APPROACH (km/h)	MINIMUM LENGTH OF PARALLEL WIDENED SHOULDER "P" (m)
60	5
70	10
80	15
90	20
100	25
110	35

**TABLE 1**

THE DIMENSIONS OF THE MAIN ROADS BAL AND BAR TREATMENTS ARE:

W = NOMINAL THROUGH LANE WIDTH (m) (INCLUDING WIDENING FOR CURVES). WIDTH TO BE CONTINUOUS THROUGH THE INTERSECTION.

C = ON STRAIGHTS - 6.5m MINIMUM FOR 19m SEMI TRAILERS & 27.5m B-DOUBLES  
ON CURVES - 7.0m MINIMUM FOR 36.5m B-TRIPLES AND 53.5m DOUBLE B-DOUBLES  
WIDTHS AS ABOVE + CURVE WIDENING (BASED ON WIDENING FOR THE DESIGN TURNING VEHICLE PLUS WIDENING FOR THE DESIGN THROUGH VEHICLE)

A = 0.5VF/3.6 (TAPER RATE: 2.0m/s) - USED ON APPROACH/DIVERGE SIDE

B = VF/3.6 (TAPER RATE: 1.0m/s) - USED ON DEPARTURE/MERGE SIDE

V = DESIGN SPEED ON THE MAJOR ROAD APPROACH (km/h)

F = C-Sw-W - FORMATION/CARRIAGEWAY WIDENING (m)

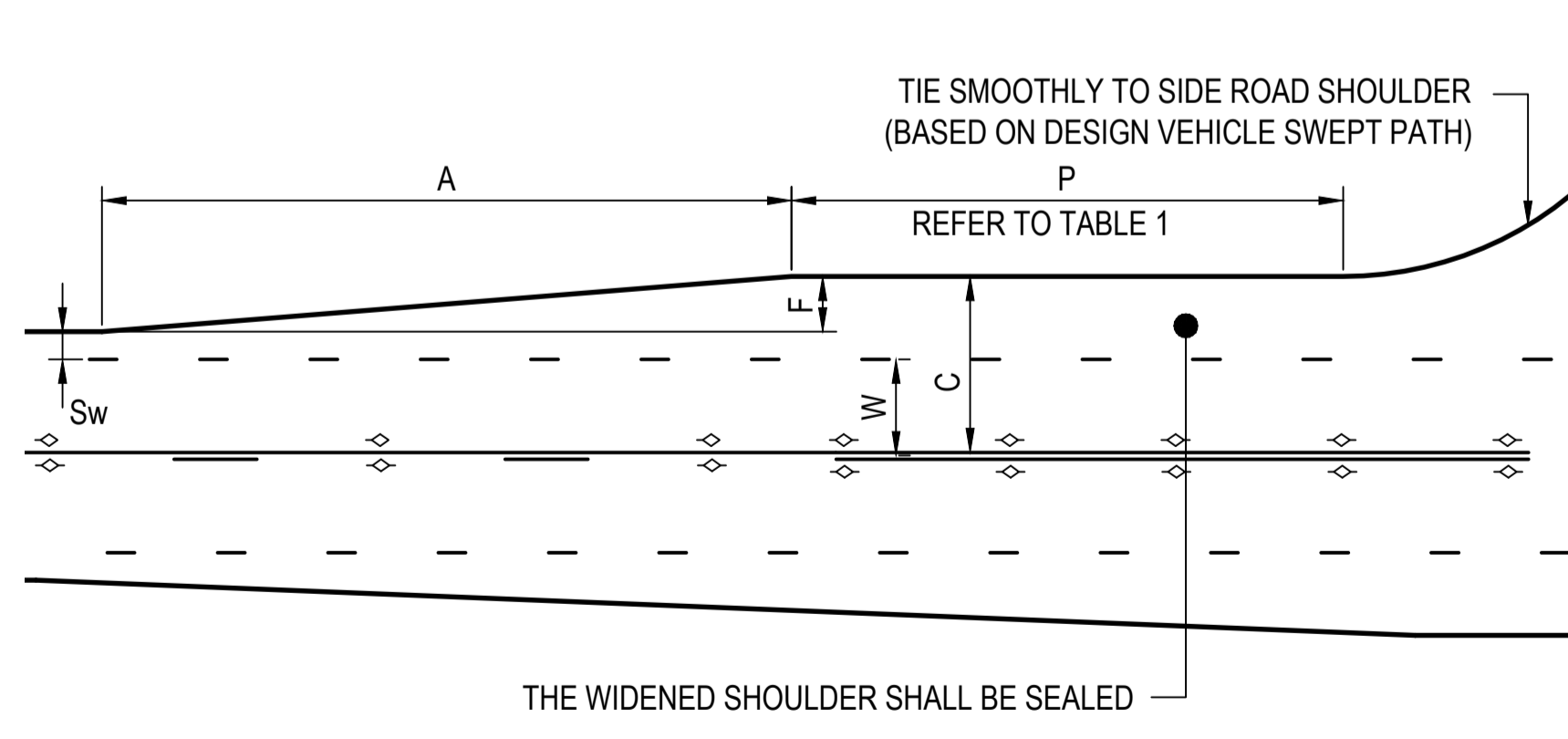
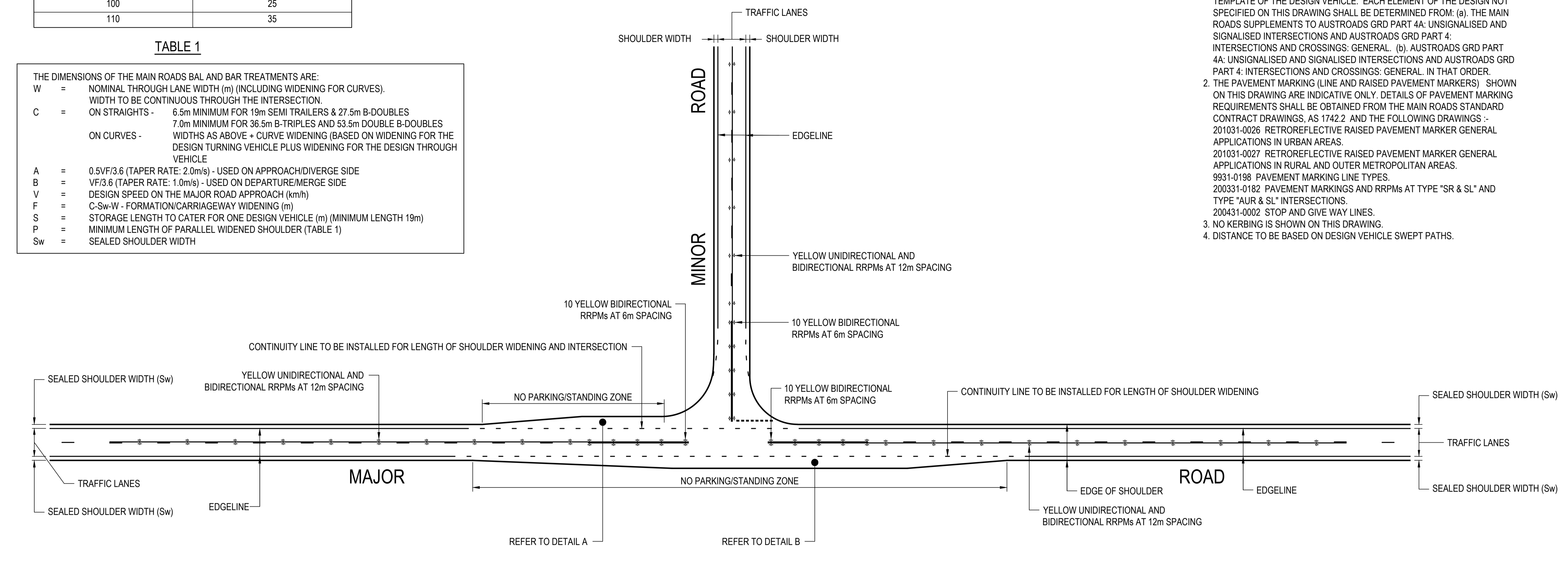
S = STORAGE LENGTH TO CATER FOR ONE DESIGN VEHICLE (m) (MINIMUM LENGTH 19m)

P = MINIMUM LENGTH OF PARALLEL WIDENED SHOULDER (TABLE 1)

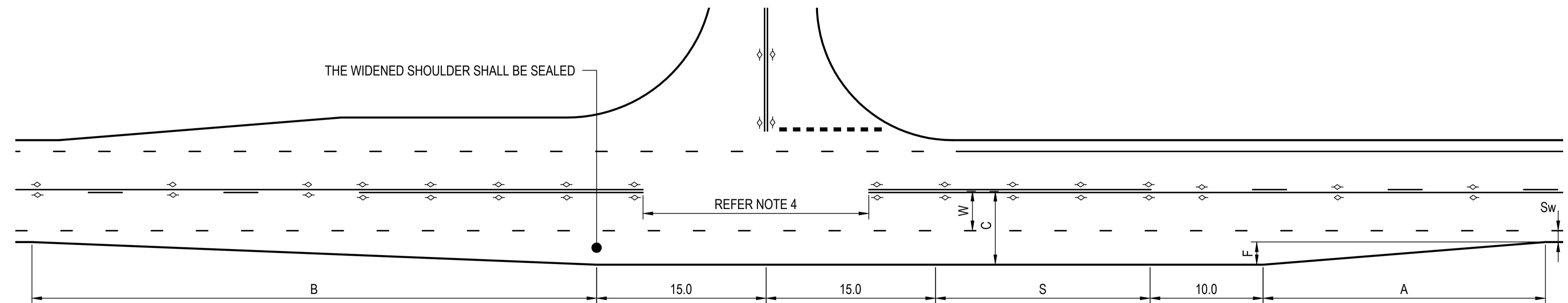
Sw = SEALED SHOULDER WIDTH

**NOTES:**

- THIS DRAWING SHOWS AN EXAMPLE 'T' INTERSECTION TREATMENT, IT SHOULD BE READ IN CONJUNCTION WITH DRAWINGS 202231-000, 202231-0008, 202231-0009, 200131-0083, 200131-0084, 200131-0085, 200131-0086, 200431-0065 AND 200431-0066. EACH TURN MOVEMENT SHOWN ON THIS SET OF DRAWINGS IS INTERCHANGABLE DEPENDING ON THE DESIGN WARRANT OF THE PARTICULAR INTERSECTION. INTERSECTION CURVE RADII SHALL BE DESIGNED FOR EACH INDIVIDUAL LOCATION USING THE TURNING TEMPLATE OF THE DESIGN VEHICLE. EACH ELEMENT OF THE DESIGN NOT SPECIFIED ON THIS DRAWING SHALL BE DETERMINED FROM: (a). THE MAIN ROADS SUPPLEMENTS TO AUSTRROADS GRD PART 4A: UNSIGNALISED AND SIGNALISED INTERSECTIONS AND AUSTRROADS GRD PART 4: INTERSECTIONS AND CROSSINGS: GENERAL. (b). AUSTRROADS GRD PART 4A: UNSIGNALISED AND SIGNALISED INTERSECTIONS AND AUSTRROADS GRD PART 4: INTERSECTIONS AND CROSSINGS: GENERAL. IN THAT ORDER.
- THE PAVEMENT MARKING (LINE AND RAISED PAVEMENT MARKERS) SHOWN ON THIS DRAWING ARE INDICATIVE ONLY. DETAILS OF PAVEMENT MARKING REQUIREMENTS SHALL BE OBTAINED FROM THE MAIN ROADS STANDARD CONTRACT DRAWINGS, AS 1742.2 AND THE FOLLOWING DRAWINGS :- 201031-0026 RETROREFLECTIVE RAISED PAVEMENT MARKER GENERAL APPLICATIONS IN URBAN AREAS. 201031-0027 RETROREFLECTIVE RAISED PAVEMENT MARKER GENERAL APPLICATIONS IN RURAL AND OUTER METROPOLITAN AREAS. 9931-0198 PAVEMENT MARKING LINE TYPES. 200331-0182 PAVEMENT MARKINGS AND RRPMS AT TYPE "SR & SL" AND TYPE "AUR & SL" INTERSECTIONS. 200431-0002 STOP AND GIVE WAY LINES.
- NO KERBING IS SHOWN ON THIS DRAWING.
- DISTANCE TO BE BASED ON DESIGN VEHICLE SWEEPED PATHS.



**DETAIL A** MAIN ROADS RURAL BAL TREATMENT



**DETAIL B** MAIN ROADS RURAL BAR TREATMENT

No.	DESCRIPTION	APPROVED & DATE
5	FONT STYLE CHANGED TO ARIAL NARROW.	C.M. 28/11/2023
4	FILE NUMBER ADDED, REFERENCES UPDATED.	C.M. 6/7/23
3	INTERSECTION TREATMENT SIGNIFICANTLY ALTERED. OLD REVISIONS REMOVED.	
AMENDMENTS		

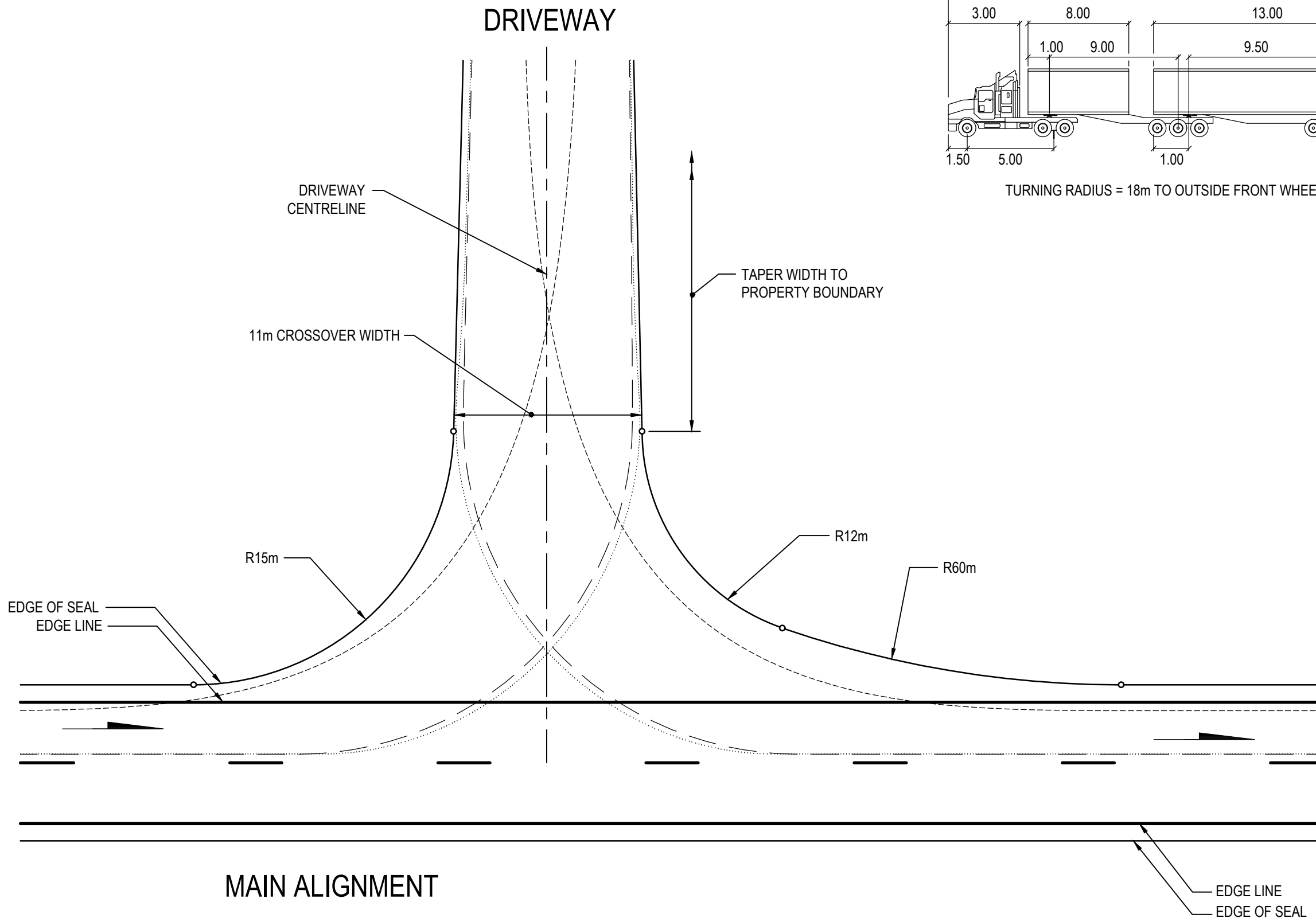
PLANNING AND TECHNICAL SERVICES DIRECTORATE  
 ROAD AND TRAFFIC ENGINEERING BRANCH  
 WATERLOO CRESCENT EAST PERTH 6004  
 Telephone 138 138

DRAWN	N. DE LA MOTTE
DESIGNED	N. DE LA MOTTE
VERIFIED	C. MAGRIPLIS 17/10/22
APPROVED	D. LANDMARK 19/10/22
FILE NO.	13/4331

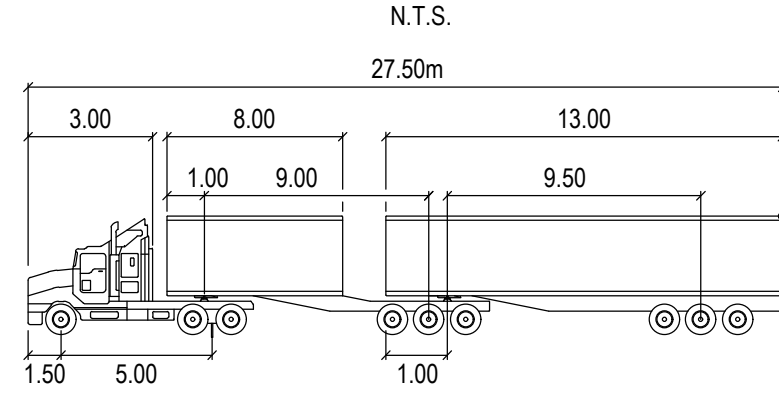
**GUIDELINE DRAWING**  
 MAIN ROADS RURAL RIGHT TURN TYPE "BAR"  
 MAIN ROADS RURAL LEFT TURN TYPE "BAL"  
 INTERSECTIONS AT GRADE SHEET 3 OF 10

MRWA DRAWING NUMBER  
**200131-0081-5**

SCALES  
 N.T.S.  
 A 1



**DESIGN VEHICLE - B-DOUBLE - MRWA RAV 2(C)**



TURNING RADIUS = 18m TO OUTSIDE FRONT WHEEL

AMENDMENTS		
No.	DESCRIPTION	APPROVED & DATE
1	TITLE AMENDED TO GUIDELINE DRAWING.	T.F 09.05.06
2	NOTES, TURNING RADIUS, DESIGN VEHICLE & LAYOUT AMENDED. TITLE BLOCK UPDATED. DRIVEWAY CENTRELINE ADDED, SEALED SHOULDERS REMOVED.	C.M. 18/11/22
3	TITLE BLOCK AND FILE No. UPDATED.	C. MAGRIPLIS 22/8/23

- NOTES**
- CROSSOVER SHOWN AS 11.0m WIDE SEAL.
  - FOR ADDITIONAL RURAL DRIVEWAY DETAILS REFER TO DRAWING 9831-6281.
  - SEAL RADIUS MAY VARY TO SUIT DRIVEWAY ALIGNMENT.

**LEGEND**

	OUTSIDE FRONT SWEEP PATH
	INSIDE REAR WHEEL PATH
	PATH OF OVERHANG



**mainroads**  
WESTERN AUSTRALIA

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Waterloo Crescent EAST PERTH 6004  
Telephone 138 138

DRAWN	E. FINDLATER
DESIGNED	B. SNOOK
VERIFIED	T. FREEMAN 06/05/05
APPROVED	R. GROVE 06/05/05
FILE NO.	13/4331

MAIN ALIGNMENT

**RURAL DRIVEWAY SETOUT**  
**B-DOUBLE**  
SCALE 1:250

GUIDELINE DRAWING  
DRIVEWAY SETOUT DETAILS  
RURAL DRIVEWAY SETOUT  
B-DOUBLE

MRWA DRAWING NUMBER 200431-0195-3

SCALES 1:250 A 3

**AMENDMENTS**

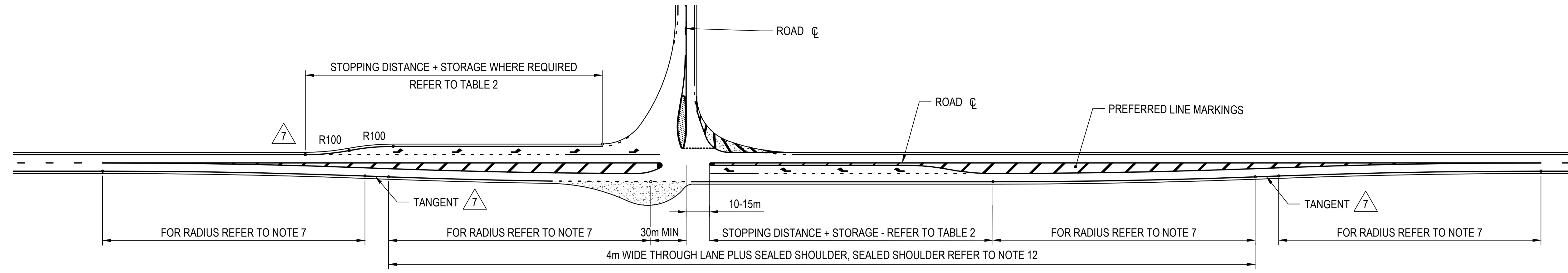
No.	DESCRIPTION	APPROVED & DATE
1	TABLE 2 AMENDED	C. MARIANO 10/04/18
2	NOTE 7 AMENDED TO REFLECT SUPPLEMENT	C. MARIANO 17/09/18
3	NOTE 6, 11 AND VEHICLE PROFILE AMENDED	D. NICHOLLS 15/01/19
4	NOTE 12 ADDED	A. WONG 06/10/22
5	TITLEBLOCK AND REFERENCES UPDATED.	C. MAGRIPLIS 10/08/23
6	FONT STYLE CHANGED TO ARIAL NARROW.	C.M. 28/11/2023
7	ACC LANE TAPER EXCL. & MINOR AMENDMENTS.	G. HUGHEY 09/05/2024

**NOTES**

**LEGEND:**  
  
 - RAISED ISLAND  
 - APRON SURFACE

**GENERAL NOTES:**

- INTERSECTION APPROACHES SHOULD BE REALIGNED TO 90 DEGREES WHERE POSSIBLE.
- SPLITTER ISLAND NOSE/HOLD LINE MIN=1.8m MAX=4.5m BEHIND THROUGH CARRIAGEWAY EDGE OF LANE. (2m OFFSET SHOWN)
- REFER TO MAIN ROADS SUPPLEMENT TO AUSTRROADS GUIDE TO ROAD DESIGN - PART 4A - SECTION 6 FOR RAISED ISLAND DIMENSIONS.
- STOPPING DISTANCES ARE BASED ON ACCELERATION AND DECELERATION TESTING OF COMBINATION VEHICLES. REPORT PUBLISHED BY ROADUSER SYSTEMS PTY LTD.
- EACH INTERSECTION TO BE INDIVIDUALLY DESIGNED BASED ON TURN PATHS.
- THE SEAL EDGE ON TURNING FLARES AND APRONS TO BE LOCATED A MINIMUM OF 0.5m OUTSIDE THE DESIGN VEHICLE SWEEP PATH
- REFER TO MAIN ROADS SUPPLEMENT TO AUSTRROADS GUIDE TO ROAD DESIGN - PART 4A - SECTION 7.2.
- LINE MARKINGS ON THIS DRAWING ARE CONCEPTUAL. THIS DRAWING IS NOT TO BE USED AS A LINE MARKING DRAWING.
- THE USE OF COLOURED PAVEMENT OR CONCRETE FOR APRONS IS SUBJECT TO THE REGION'S APPROVAL.
- A MINIMUM OF 100m OF SIDE ROAD TO BE SEALED.
- PROVIDE 600m LONG ACCELERATION LANE (OR LANES) WHEN THE AADT ON THE THROUGH ROAD EXCEEDS 600 WITH AT LEAST 2 ROAD TRAINS PER HOUR ON THE TERMINATING LEG. CONSIDERATION COULD BE GIVEN TO EXTENDING THE ACCELERATION LANE LENGTH TO 1500m (MIN) AND LINE MARKING AS AN OVERTAKING OPPORTUNITY.
- SEALED SHOULDER WIDTH TO MATCH 2031 CROSS SECTION IN MRWA SUPPLEMENT TO AUSTRROADS GUIDE TO ROAD DESIGN PART 3. 1m MINIMUM.



NOTE - ALL LANE WIDTHS 3.5m UNLESS OTHERWISE SPECIFIED

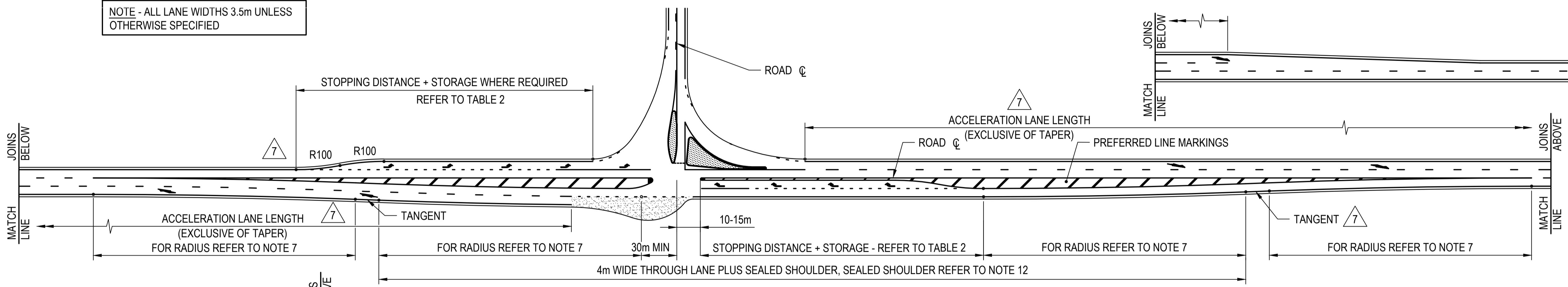
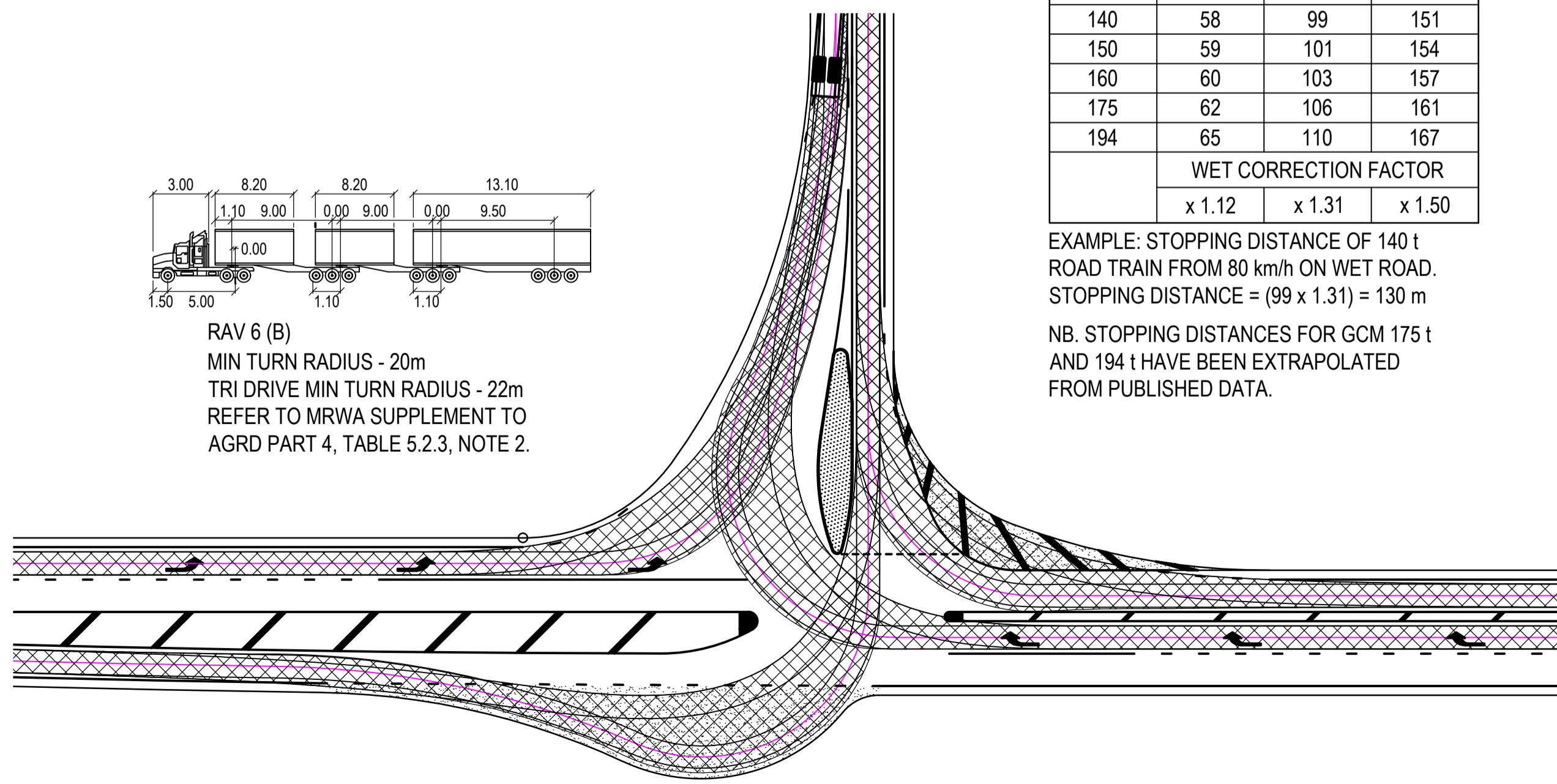
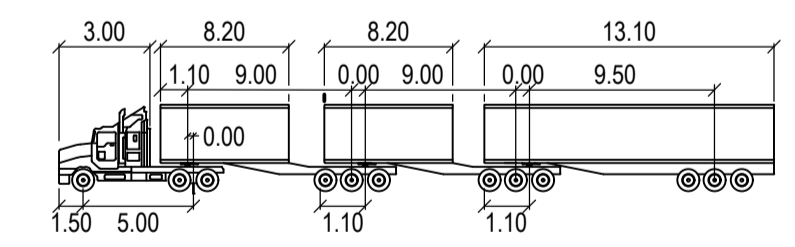
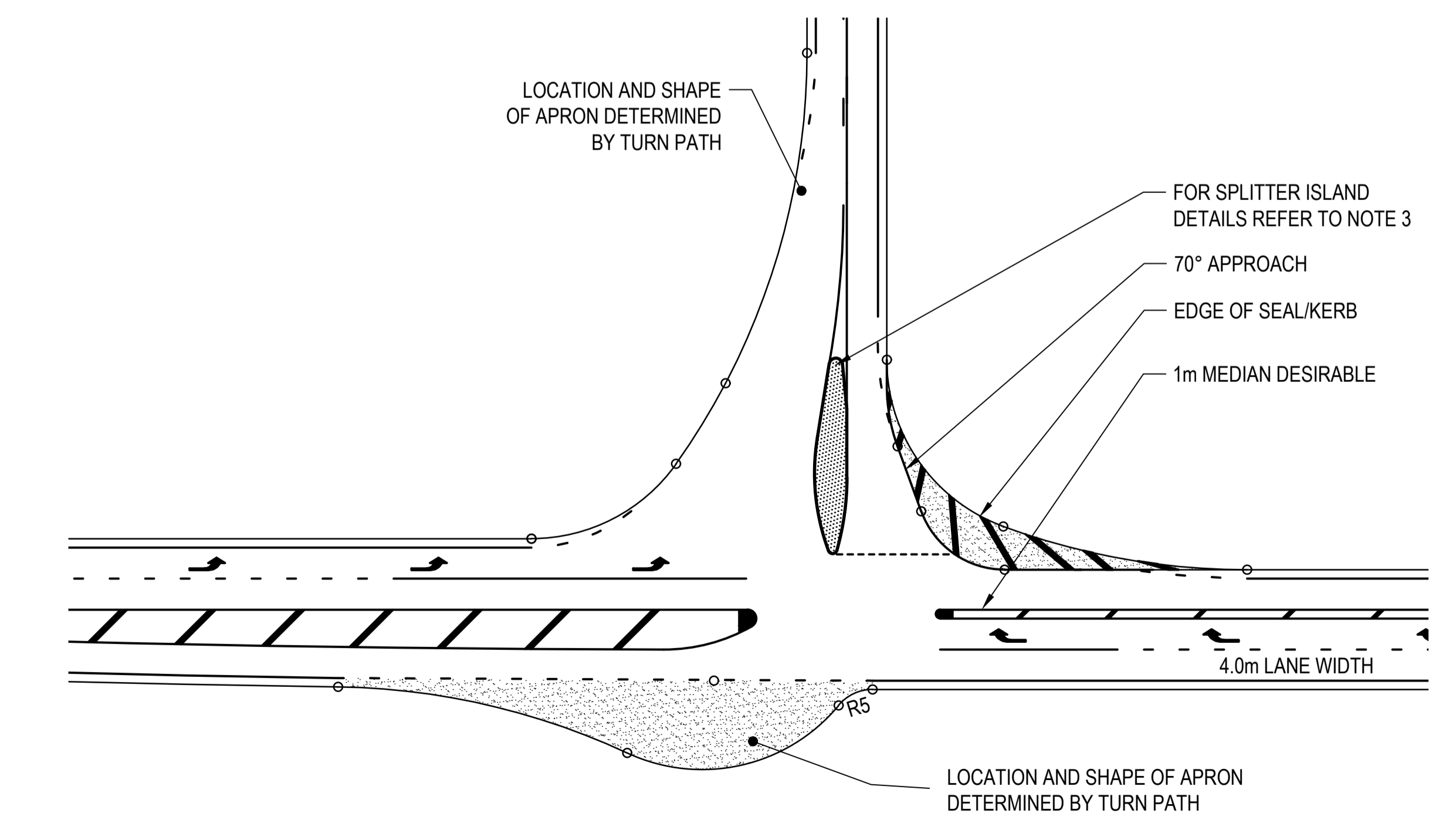


TABLE 2 - SCHEDULE OF STOPPING DISTANCE

GCM (t)	STOPPING DISTANCE (m)		
	60-0 km/h	80-0 km/h	100-0 km/h
40	45	78	121
50	46	80	124
60	47	82	127
70	49	84	130
80	50	86	133
90	51	88	136
100	53	91	139
110	54	93	142
120	55	95	145
130	56	97	148
140	58	99	151
150	59	101	154
160	60	103	157
175	62	106	161
194	65	110	167
	WET CORRECTION FACTOR		
	x 1.12	x 1.31	x 1.50

EXAMPLE: STOPPING DISTANCE OF 140 t ROAD TRAIN FROM 80 km/h ON WET ROAD.  
 STOPPING DISTANCE = (99 x 1.31) = 130 m

NB. STOPPING DISTANCES FOR GCM 175 t AND 194 t HAVE BEEN EXTRAPOLATED FROM PUBLISHED DATA.



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 DESIGNED: A. WONG  
 VERIFIED: T. FREEMAN 29/4/14  
 APPROVED: R. GROVE 29/4/14  
 FILE NO.: 13/4331

**GUIDELINE DRAWING**  
 ROAD TRAIN INTERSECTION  
 T-INTERSECTION  
 EXAMPLE TREATMENT FOR 36.5m ROAD TRAIN

1:1000  
1:500  
SCALES  
A 1

**Document prepared by**

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